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SJFHQ Simulation

by

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A four level architecture has been developed for SJFHQ processes. This architecture has been used to develop a simulation of SJFHQ operations. Correct simulation performance has been verified and initial results produced. The results focus on personal work tasking and multi-tasking effects.

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EXECUTIVE SUMMARY

A model of SJFHQ processes, Effects-Based-Planning (EBP) and Operational Net Assessment (ONA) update, including detailed architectures, has been developed based on the June 03 Concept of Employment, October 03 Standard Operating Procedures, and SJFHQ Subject Matter Expert experience.

A database-logic simulation of SJFHQ has been developed, its correct operation verified, and initial results produced.

The model has focused on pre-crisis operations (where indications and warnings intimate an impending crisis for which an existing ONA has relevancy) and an SJFHQ integrated with a Regional Combatant Commander staff. Distributed operations are correctly represented, but not SJFHQ operating as/with a Joint Task Force.

The simulation has been structured to focus on personnel issues: individual workloads, multitasking effects, and how these effect overall time-of-performance of SJFHQ functions.

Simulation results show that there are large differences in individual workloads. The span of percent of time spent on SJFHQ tasks ranges from 94% for the Pol/Mil Planner and 55% for the Aerospace Planner. While these numbers are only approximations, they do indicate that adjustments in manning, cross-training, or utilization may be needed.

The results produced are considered preliminary because there is no body of information that comes from actual field operations that can be used to parameterize the simulation. Before producing results to be used for decision-making, an appropriate set of parameters should be obtained and model validation performed.

The simulation easily reveals the results of personnel multi-tasking and associated work rules. Current work rules are that all individuals involved with a task work the full duration assigned to the task before it can be completed. Modifying this rule will change simulation performance. This also translates into work rules needed to optimize SJFHQ performance during an operation.

The simulation takes only approximately 3 seconds to run through one full cycle of processes. This simulates 260 hours of operational work time and 6000 individual task assignments. The database methodology being used is highly efficient. The methodology allows one to use a set of tables to drive the simulation and these tables are easy and transparent to make modifications to change both the model architecture and simulation parameters. Modification to replicate different real instantiations of SJFHQ utilization and people tasking will be easy to accomplish, including performing what-if studies.

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1.0 INTRODUCTION

Standing Joint Forces Headquarters SJFHQ is a concept that was introduced by Joint Experimentation Command during Millennium Challenge 2000. A standing element was proposed that would provide information and collaboration support for Regional Combatant Commanders and/or Joint Task Forces. It is planned that this element will consist of the 65 people, as described by the billet descriptions in Annex D of the Concept of Employment. This includes system analysis personnel (initially six) who are "not currently part of the SJFHQ UMD, [but System of Systems] SoSA analysts work in the SJFHQ and provide essential, habitual support for ONA preparation." Responsibilities for the SJFHQ are to maintain and provide information databases, collaboration capabilities, and subject-matter experts to assist in conducting the Effects-Based Planning (EBP) and Operations (EBO) processes. Developing and maintaining the Operational Net Assessment (ONA) database is one of the primary responsibilities of the SJFHQ organization.

SJFHQ personnel would provide a core of situationally aware, trained experts deemed necessary to conduct planning using the new EPB processes. They would also develop and make available to the Area Command information that applies to operations in its Area of Responsibility (AOR). The SJFHQ would also integrate directly with any regional command structure established to manage a crisis, assist in utilizing information from the ONA database, and participate in the overall command planning and decision-making cycle. Implementation of this new SJFHQ concept is expected to greatly enhance a region's C3I processes and crisis management.

SJFHQ is a new concept that has not yet been fully implemented. Personnel are currently being trained to occupy these billets. Standing up the organizations and integrating them into existing staffs is underway. Detailed information about this organization's operation does not yet exist, such as the amount of time or effort involved to carry out all the various SJFHQ responsibilities. The main focus of this modeling and simulation work, and the simulation that has been developed, is to better understand personnel issues: how many, what types, assignments and workloads, etc.

It is expected that different combatant commanders (COCOMs) will use their SJFHQ element in a variety of ways, and that SJFHQ utilization will also vary with the situation. It will be some time before a body of information is available that provides input needed to help establish optimal manning and utilization of SJFHQ. Currently needed is a means to develop SJFHQ implementation information so that initial use of these units can be as efficient as possible. Process modeling and simulation of SJFHQ operations is an efficient and cost effective means to obtain data to provide inputs to answer key questions of interest to concept developers. Simulation runs can be used to examine details regarding SJFHQ processes and task performance.

The SJFHQ modeling and simulation project reported here has developed an initial version of the needed simulation and produced initial runs and results. This report contains the following sections:

Progress and Future Directions provides a brief description of the steps that have been taken to develop the simulation, its current state and uses. In this section we also describe

work needed to configure the simulation to produce more detailed actual implementation versions and produce additional information required by the program office.

Simulation Methodology describes how the underlying model has been developed and how the simulation is set up and run.

SJFHQ Processes Structure describes, in detail, the structure of the processes and their interrelations.

Personnel Tasking lists personnel assignments down to the level of producing various information products.

SJFHQ Simulation describes details of the simulation, with emphasis on work performance and personnel multi-tasking.

Simulation Results are presented to illustrate how the simulation is run and products produced.

Simulation Reconfiguration and Analysis Methodology describes how simulation parameters and personnel assignments are varied, how those variations are mapped to specific analysis questions, and new results produced.

Appendices contain the detailed tables and maps of SJFHQ processes.

The work reported here was carried out using funds provided by the Joint Forces Command SJFHQ program office.

2.0 PROGRESS AND FUTURE DIRECTION

2.1 Work Accomplished

The following simulation development tasks have been completed. Tasks are listed in the order they were accomplished to illustrate the logical process of simulation development.

1. Determine all SJFHQ processes.
2. Decompose into three levels of sub-processes, down to the individual task level.
3. Develop an SJFHQ operational architecture.
4. Vet the architecture with J89.
5. Identify tasks that are performed to accomplish these processes.
6. Determine task sequencing, interdependences, and information flow.
7. Identify the individuals, by title, that work on these tasks.
8. Define task workgroups (all processes are decomposed to the task level).
9. Develop a methodology and accompanying tables that map people, task workgroups, and processes to provide the database foundation for the simulation.
10. Develop a multi-tasking module that represents human work performance.
11. Create the baseline SJFHQ simulation.
12. Perform rigorous tests of the simulation to insure proper operation (Verification).
13. Develop and report the results of simulation runs to illustrate use methodologies.

Each of these simulation development tasks is briefly described below. Described is the type of work done rather than details. The source documents for this development were:

Concept of Employment, June 03, and
Standard Operating Procedures, October 03.

Detailed review of this work was provided by CDR John Looney, a subject matter expert, and a former SJFHQ team member.

Determine SJFHQ processes: The following information was obtained from the reference documents. Concept of Employment has chapters describing:

Staff relationships between the RCC and SJFHQ
Staff relationships between the JTF and SJFHQ
Pre-crisis planning.

Also included are appendices describing the processes:

Effects Based Operations
Operations Net Assessment (ONA)

and others detailing SJFHQ organization and billet descriptions.

Standard Operating Procedures is a much more extensive document. It contains six chapters describing the activities of the following SJFHQ sub-organizations:

Command Group
Information Superiority Group
Operations Group
Logistics Group
Planning Group
Knowledge Management Team

Included are appendices that describe the activities of each, including details on Effects Based Planning (EBP) and ONA. There is also an appendix describing responsibilities of the following Boards, Centers, and Cells:

Joint Information Superiority Cell
Joint Collection Management Cell
Joint Coordination Board (JCB)
JCB Working Group
Joint Fires Working Group
Time-Sensitive Targets Cell
Logistics Coordination Board
Blue/Red Cell
Joint Planning Group (at JTF level)
Joint Knowledge Management Board

Considerable interpretation of the material in these reports was needed to produce the process maps and tables that comprise the base of the simulation. In many cases the experience of the Subject-Matter-Expert (SME) had to be used to provide correct interpretations. The end result is a process mapping that captures significant SJFHQ EBP and ONA updating operations and places them in correct relationship to each other.

Decompose into sub-processes: The simulation tool used for this project, Extend, allows one to employ an object-oriented, hierarchical approach. This approach simplifies setting up the underlying model. Relatively few top-level process blocks are defined that capture the major operational processes undertaken. The six top-level process blocks for SJFHQ are shown in Table 1. Within each process there are a large number of tasks that must be performed. In what follows, it is shown how these six processes are decomposed into three levels of sub-processes. Each level of sub-processes contains logical groupings; they are similar in function, they are performed by the same personnel, they address the same tactical operation, etc. The end result is a hierarchy of processes and sub-processes that correctly represent the operation and that also provide the structure needed for the model and simulation. A general rule in doing this type of decomposition is to decompose no further than necessary for the particular study being done.

Table 1 shows the processes and its number of sub-processes at each level.

Table 1. SJFHQ Top-Level Processes and Number of Sub-Processes for each Sub-Level within the Model.

	Sub-Processes		
Process	Level-1	Level-2	Level-3
Command Directives	6	4	19
Effects-Based Planning	4	15	76
Operational Net Assessment	7	35	235
Collaborative Info Environment	3	3	10
Training/Exercises	3	3	15
Deployment/Logs/Transport	3	3	22

Level-3 is the task level, the level at which personnel produce information. There are 377 of these task-level sub-processes. The process table contained in Appendix-1 presents the details of this decomposition.

Develop an SJFHQ Operational Architecture: The architecture required for process simulation utilizes components from Department of Defense Architecture Framework (DODAF) but requires more detail. The decomposition referred to above has been captured in process maps that are presented in Appendix-2. These maps provide an easy visualization of information flow and process interrelationships. Depending on the simulation technique employed, one directly uses architecture maps or the process table to build the simulation. For the standard technique where process blocks are laid out on a visual template and connections made between them, the maps are used. For the database method reported here, the tables are used. Even so, developing the maps was a necessary step to ensure that information flow is correct, logical, and contains neither sinks (processes that have no output) nor infinite loops.

Vet the Architecture with J-89: J-89 has the mandate to develop operational architectures for SJFHQ and JTF. It is important that the architecture developed for this project is in agreement with the SJFHQ architecture that is officially approved. Architectures developed for this project go to a lower level than that required by J89, thus we vetted our architectures only at the top levels.

Identify Tasks: Several different types of SJFHQ responsibilities have been identified and tracked: scheduled meetings, information production, command and team decisions, information assessment, etc. Many involve sub-processes, such as producing individual/specific pieces of information. These have been broken down to individual tasks, to the level where one can identify the groups of personnel that work on them.

Determine Task Sequencing, Interdependences, and Information Flow: Processes, and their included tasks, are performed in an order such that information is produced and moves through the processes in the correct order. Some processes must be in a pre-determined sequence; some are in parallel. This has been mapped in order to set up the simulation correctly. Maps that allow visualization of this flow are contained in Appendix-2.

Identify the Individuals, by Title, that Work Tasks: The main thrust of the simulation is to track personnel activities, the work they have on their desktops, how they are affected by multitasking, etc. Doing this requires knowledge of the exact personnel who are assigned to each task. The reference reports show processes assigned to major groups and also the personnel within these groups. For most cases they do not contain personnel information down to the task level. Knowledge of the SME was required to break this down to lower-level tasks and individual personnel assignments.

Define Task Workgroups: In order to account for task sharing among several individuals, it is convenient to define groups that are responsible for carrying out each task. These can be, but are not necessarily, groups that are defined in the SJFHQ documents. There is some artificiality in

defining these task workgroups in that they are not necessarily actual operational/tactical groups. They are a modeling convenience because they allow for a simple way to record personnel assignments for different SJFHQ configurations. The task workgroups to which an individual is assigned can be simply entered into a table to produce a unique configuration. At this point in the project, personnel assignments are contained in the master table presented in Appendix-1. The separate table for assignments to small workgroups has not been implemented.

Develop Maps of People, Task Workgroups, and Processes: Assignment of people to task-level sub-processes has been completed. As noted immediately above, assignment of workgroup titles and subsequent association of these workgroups with sub-processes has not been done. This does not affect simulation operation. What is missing is a convenient graphical user-interface to facilitate database manipulation to make changes to reassign personnel.

Develop a Human Multi-Tasking Module: The core of the simulation is the ability to model an individual performing tasks under conditions where he/she can be interrupted by meetings or higher-priority tasks, have several tasks on their desk at the same time, and need to coordinate work with others. A module has been developed to model these human performance modalities. The simulation contains a human multi-tasking module for each of the SJFHQ personnel. A step that remains to be done is assigning individual skill levels. This will enable conducting simulation runs that take into account varying skill levels of SJFHQ members.

Create the Baseline SJFHQ Simulation: It is not possible at this time to develop a simulation that is representative of "SJFHQ reality" because such a reality does not yet exist. The baseline that has been developed contains all of the known processes and tasks that are performed by the SJFHQ organization. From this baseline, and the modular and database simulation configuration, one can easily reconfigure the SJFHQ simulation to produce a simulation that represents various realities, such as variations on SJFHQ utilization by specific COCOMs. It is also easy to reconfigure the simulation to do "what-if" analyses.

Perform Simulation Tests: The SJFHQ simulation has been run for a range of conditions to test proper performance of task routing, the human performance module, and information passing between processes. Conditions have been set so that the work distribution causes overload and blocking at task workgroups. Task performance times have been adjusted to test process synchronization and to determine critical process nodes (processes where delays will cause significant disruptions in SJFHQ performance).

Develop and Report Results from Simulation Runs: The results produced thus far are representative of the types that can be produced and represent one step toward simulation validation. True validation cannot be done until field data is available from SJFHQ operations.

2.2 Required Future Work

The initial simulation produced is a baseline. The SJFHQ simulation methodology, structure, and analysis methods are now in place. Results that have been produced were to validate correct simulation performance, not SJFHQ performance in an operational situation. Additional work

needed to provide results that apply to operational situations or for program office planning are described below. We refer to steps A, B, and C below in defining needed work.

Step A. The baseline simulation has the principal attributes:

It contains all required EBP and ONA updating processes.
It contains a methodology for simulation runs and analysis.
It is modular so that rapid reconfiguration can be accomplished.
It has been validated for proper operation.

Step B. A principal step in simulation development is parameterization of its process modules/blocks. Parameters most often used are:

Processing time.
Process capacity.
Information input and output requirements for initiation and completion.
Information content and formats.
Conditions such as mandated schedules and synchronization.

Strictly speaking, information content, formats, schedules, and synchronization are not process parameters, rather they are treated as process interface requirements.

Step C. Simulation results are produced in response to a set of questions or requirements. Before results can be produced, the simulation requires the following information:

A statement of the question(s) to be answered.
A set of results parameters (measures) to be produced to answer the questions.
Conditions under which the results are to be determined.

The baseline simulation containing the principal attributes (described in step A) has been completed. Parameterization of the process modules and blocks (described in step B) has been accomplished using the SME's expertise, however this parameterization is not necessarily representative of an existing or planned operational situation. Simulation results produced in response to a set of questions or requirements (described in step C) remains to be done. In the following section we begin with step C then proceed to step B, which is the normal method for study development. All studies require that the baseline exist, step A, which has been accomplished.

Study Definition: We envision two types of studies:

1. What-ifs defined to meet Program Office objectives.
2. Determination of the effectiveness of proposed and actual COCOM use of SJFHQ.

For the first type of study the simulation would be configured to match the what-if. For example, one could determine the effectiveness of adding particular types of personnel to SJFHQ, or the effectiveness of reconfiguring workgroups.

COCOM use-effectiveness studies require a definition of proposed configuration. SJFHQ could be fully integrated, used as a stand-alone unit, be responsible for some decisions, etc. It may be that not all 58 people (or 65 if considering System-of-System Analysis personnel) would be available. Model structure would be altered to correspond to the particular configuration.

Study Results Parameters: The simulation has been set up to produce time measures: start and end times for all processes and sub-processes and for all individuals working on each task. A large number of utilization and efficiency studies can be accomplished with such output. Definition of the exact questions for which data is desired is needed at the outset of a study, which then allows the correct configuration of output tables to produce those results.

An example of simulation configuration effects that can be caused by result specification is useful here. One could determine the effect on product quality of having a cutoff time for tasks (such as stopping work on a product to meet a delivery time). In order to produce such a result one would change task performance work rules (see below) and also produce an information quality measure. Such a situation is realistic, e.g. whether effects analysis is completed or has the information needed for it to be done.

Study Conditions and Simulation Configuration: A simulation has to be configured for a set of conditions:

- Operational conditions
- Systems to be used
- Number of personnel and their assignments.

Changes in conditions can cause changes in either or both simulation architecture or parameters.

Simulation Parameters: The simulation contains several types of parameters

- Task completion times
- Personnel work rules
- Task priority rules
- Meeting and briefing priorities
- Task performance work rules.

3.0 SIMULATION METHODOLOGY

The SJFHQ simulation was developed with Extend simulation software, a highly respected off-the-shelf discrete event application that can rapidly develop a wide range of process models (http://www.imaginethatinc.com). Boeing's Phantom Works group has substantial expertise in utilizing Extend simulation software having developed simulation analysis tools for a wide variety of military and commercial system architectures. Validated simulations have been developed for a variety of domains, including network-centric communication systems, time-critical targeting scenarios, and resource/logistical optimization.

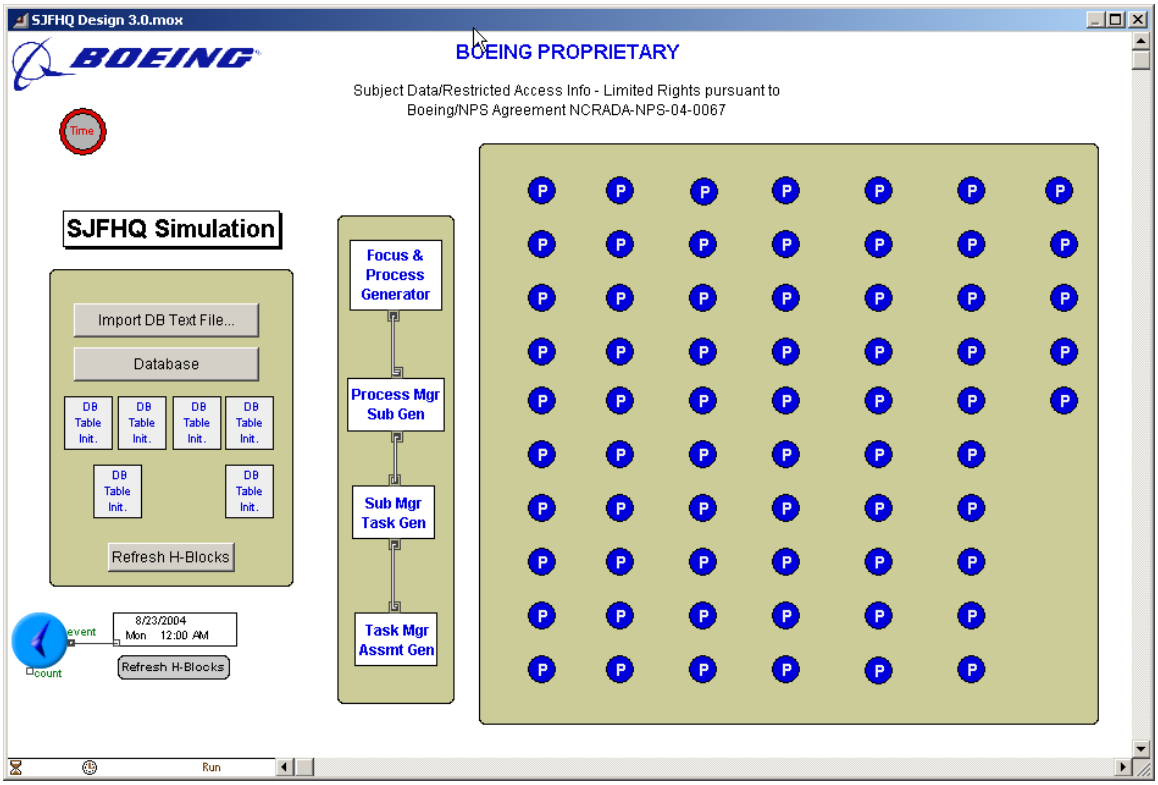


Figure 1. SJFHQ Model, Top Layer

Models in Extend are structured by connecting library block components that logically describe the process or system that is modeled. Extend provides a library of validated base-blocks to work with and over 95% of the SJFHQ model was developed with these standard Extend components. These libraries were then augmented with custom block components that were necessary to model a number of unique characteristics of the SJFHQ scenario. The custom Boeing/SJFHQ blocks are stored and delivered in an Extend library file that is installed before launching the model file.

The SJFHQ model leverages Extend's strong hierarchical capabilities, where base library block components are further encapsulated for model organization, library storage and replication. For example, each of the 65 personnel in the SJFHQ scenario is represented by a Person hierarchical block (see multiple "P" blocks in top level view). The Person h-block is added from the custom

SJFHQ library and is made up of basic Extend library components. Note that within this Person h-block is another h-block called "Working on Assignments" that groups the model constructs for multi-tasking assignments and prioritizing of assignments by an individual.

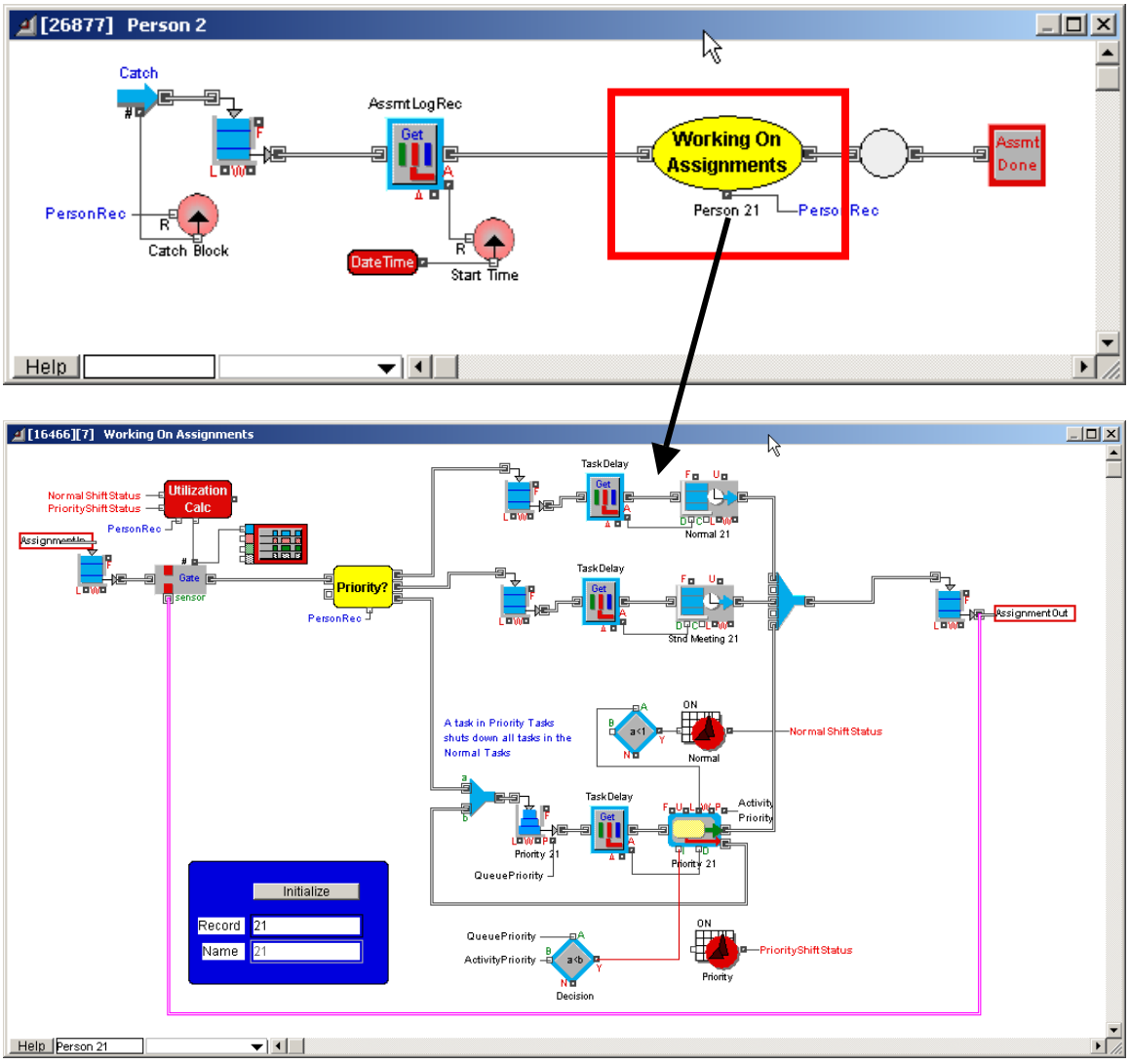
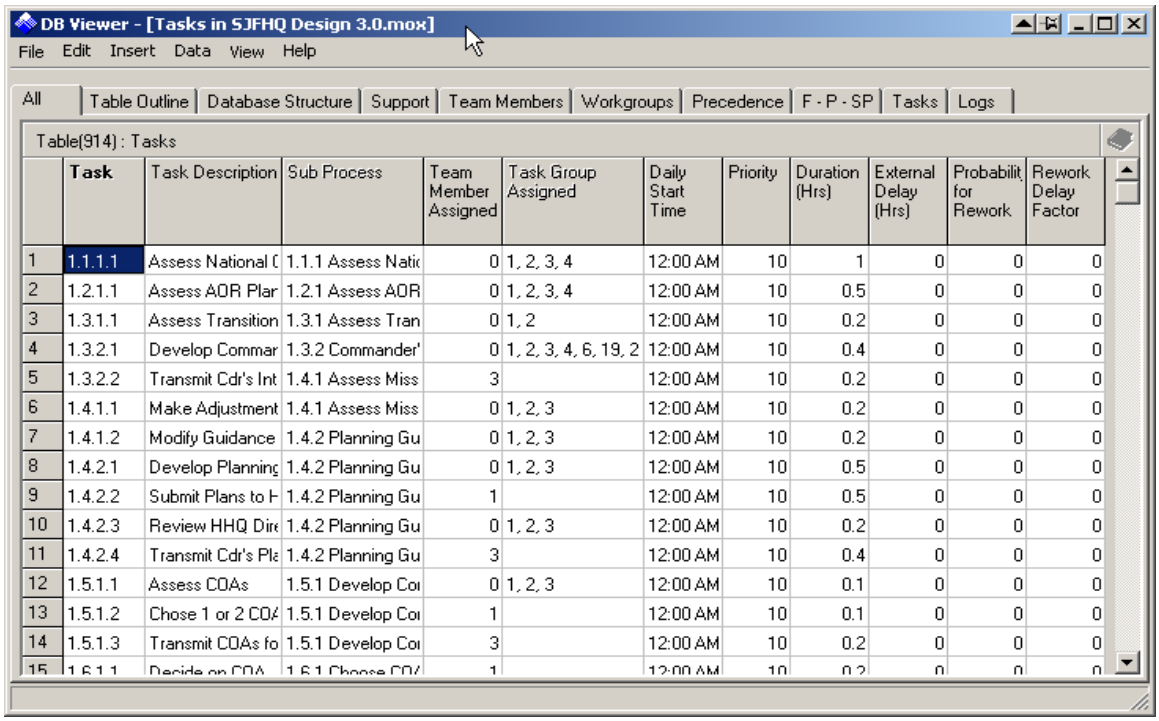


Figure 2. Model Constructs, Person H-Block

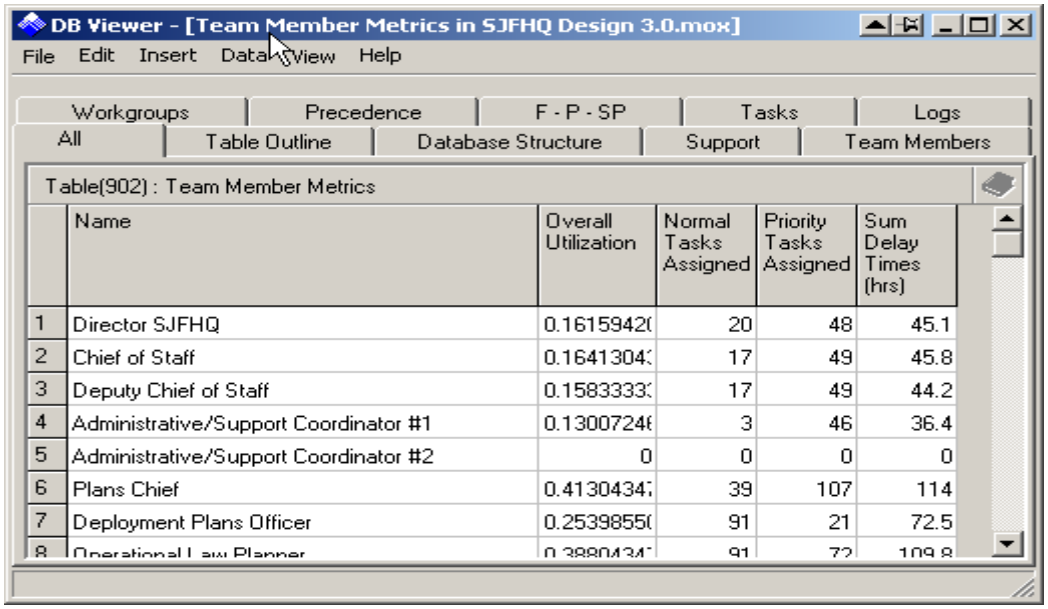
Extend is uniquely powerful in it's ability to structure scenario input data within it's own internal relational database. For the SJFHQ application, the simulation database structure is an Extend replication of the Excel spreadsheet that specifies information flow between the processes and sub-processes (see Appendix 1). Database tables are directly (and efficiently) accessed by the model constructs during run-time. The database can then be easily modified with an alternative scenario for comparison.



	Task	Task Description	Sub Process	Team Member Assigned	Task Group Assigned	Daily Start Time	Priority	Duration (Hrs)	External Delay (Hrs)	Probabilit for Rework	Rework Delay Factor
1	1.1.1.1	Assess National (	1.1.1 Assess Natic	0	1, 2, 3, 4	12:00 AM	10	1	0	0	0
2	1.2.1.1	Assess AOR Plar	1.2.1 Assess AOR	0	1, 2, 3, 4	12:00 AM	10	0.5	0	0	0
3	1.3.1.1	Assess Transition	1.3.1 Assess Tran	0	1, 2	12:00 AM	10	0.2	0	0	0
4	1.3.2.1	Develop Commar	1.3.2 Commander'	0	1, 2, 3, 4, 6, 19, 2	12:00 AM	10	0.4	0	0	0
5	1.3.2.2	Transmit Cdr's Int	1.4.1 Assess Miss	3		12:00 AM	10	0.2	0	0	0
6	1.4.1.1	Make Adjustment	1.4.1 Assess Miss	0	1, 2, 3	12:00 AM	10	0.2	0	0	0
7	1.4.1.2	Modify Guidance	1.4.2 Planning Gu	0	1, 2, 3	12:00 AM	10	0.2	0	0	0
8	1.4.2.1	Develop Planning	1.4.2 Planning Gu	0	1, 2, 3	12:00 AM	10	0.5	0	0	0
9	1.4.2.2	Submit Plans to H	1.4.2 Planning Gu	1		12:00 AM	10	0.5	0	0	0
10	1.4.2.3	Review HHQ Dire	1.4.2 Planning Gu	0	1, 2, 3	12:00 AM	10	0.2	0	0	0
11	1.4.2.4	Transmit Cdr's Pla	1.4.2 Planning Gu	3		12:00 AM	10	0.4	0	0	0
12	1.5.1.1	Assess COAs	1.5.1 Develop Cor	0	1, 2, 3	12:00 AM	10	0.1	0	0	0
13	1.5.1.2	Chose 1 or 2 COA	1.5.1 Develop Cor	1		12:00 AM	10	0.1	0	0	0
14	1.5.1.3	Transmit COAs fo	1.5.1 Develop Cor	3		12:00 AM	10	0.2	0	0	0
15	1.6.1.1	Decide on COA	1.6.1 Choose COA	1		12:00 AM	10	0.2	0	0	0

Figure 3. Database Viewer, Tasks Definitions Table

The SJFHQ simulation database is used to collect specific customized outputs. It is expected that use of this simulation will focus on personnel utilization and time to complete tasks, one of the principal outputs collected is personnel work hours by task. Table 4 shows that output.



	Name	Overall Utilization	Normal Tasks Assigned	Priority Tasks Assigned	Sum Delay Times (hrs)
1	Director SJFHQ	0.1615942(	20	48	45.1
2	Chief of Staff	0.1641304:	17	49	45.8
3	Deputy Chief of Staff	0.1583333:	17	49	44.2
4	Administrative/Support Coordinator #1	0.1300724(	3	46	36.4
5	Administrative/Support Coordinator #2	0	0	0	0
6	Plans Chief	0.4130434:	39	107	114
7	Deployment Plans Officer	0.2539855(	91	21	72.5
8	Operational Law Planner	0.3880434:	91	72	109.8

Figure 4. Database Viewer, Team Member Metrics

A plotter for each team member shows the number of tasks on their desk at any given time during the simulation timeline (Figure 5).

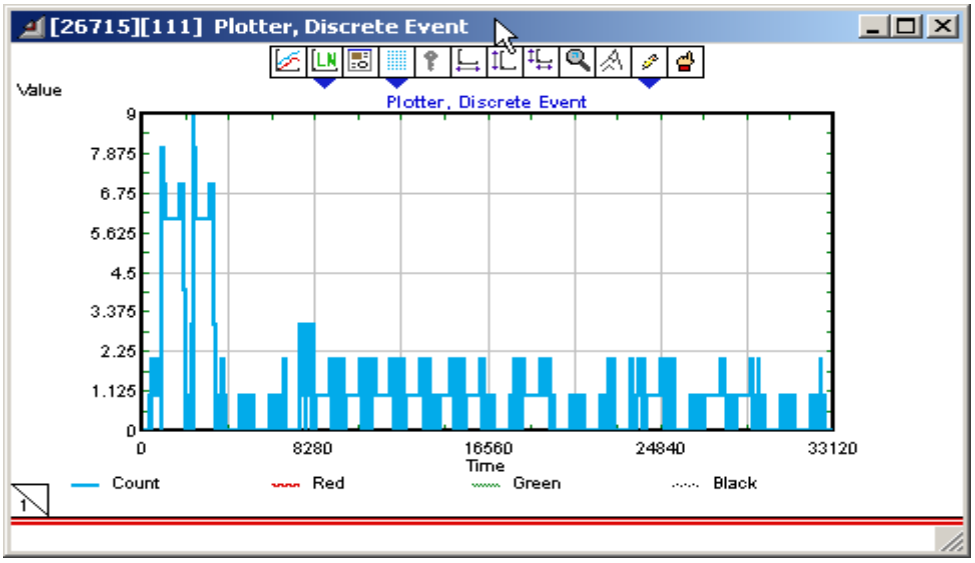
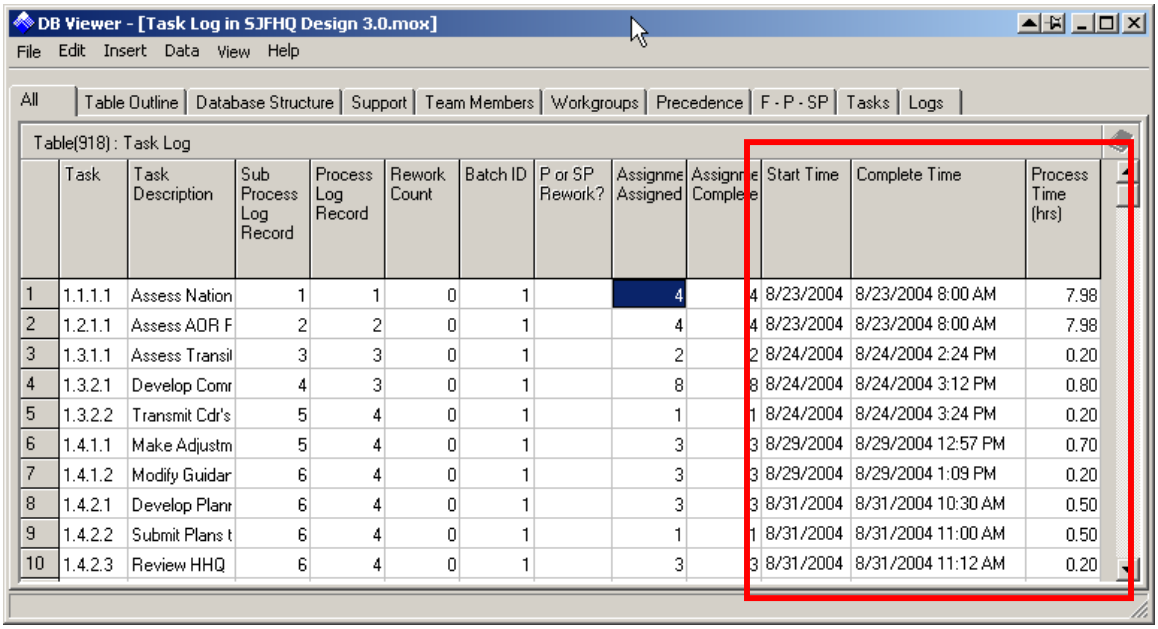


Figure 5. Plotter, Number of Tasks on Person's Desktop

The model also logs each "instance" of a layer that has been initiated by the model. Records in the log tables (Focus, Process, Sub Process, Task and Assignment levels) capture start time, completion time, and show the number of hours elapsed from start to finish.



	Task	Task Description	Sub Process Log Record	Process Log Record	Rework Count	Batch ID	P or SP Rework?	Assignme Assigned	Assignme Complete	Start Time	Complete Time	Process Time (hrs)
1	1.1.1.1	Assess Nation	1	1	0	1		4	4	8/23/2004	8/23/2004 8:00 AM	7.98
2	1.2.1.1	Assess AOR F	2	2	0	1		4	4	8/23/2004	8/23/2004 8:00 AM	7.98
3	1.3.1.1	Assess Transil	3	3	0	1		2	2	8/24/2004	8/24/2004 2:24 PM	0.20
4	1.3.2.1	Develop Comr	4	3	0	1		8	8	8/24/2004	8/24/2004 3:12 PM	0.80
5	1.3.2.2	Transmit Cdr's	5	4	0	1		1	1	8/24/2004	8/24/2004 3:24 PM	0.20
6	1.4.1.1	Make Adjustm	5	4	0	1		3	3	8/29/2004	8/29/2004 12:57 PM	0.70
7	1.4.1.2	Modify Guidar	6	4	0	1		3	3	8/29/2004	8/29/2004 1:09 PM	0.20
8	1.4.2.1	Develop Plan	6	4	0	1		3	3	8/31/2004	8/31/2004 10:30 AM	0.50
9	1.4.2.2	Submit Plans t	6	4	0	1		1	1	8/31/2004	8/31/2004 11:00 AM	0.50
10	1.4.2.3	Review HHQ	6	4	0	1		3	3	8/31/2004	8/31/2004 11:12 AM	0.20

Figure 6. Database Viewer, Tasks Log Table

4.0 SJFHQ PROCESSES STRUCTURE

4.1 Core, Top-Level, Processes and Levels Structure

The six "core" processes included in the SJFHQ model and the three levels of sub-processes within each are depicted in Figure 7.

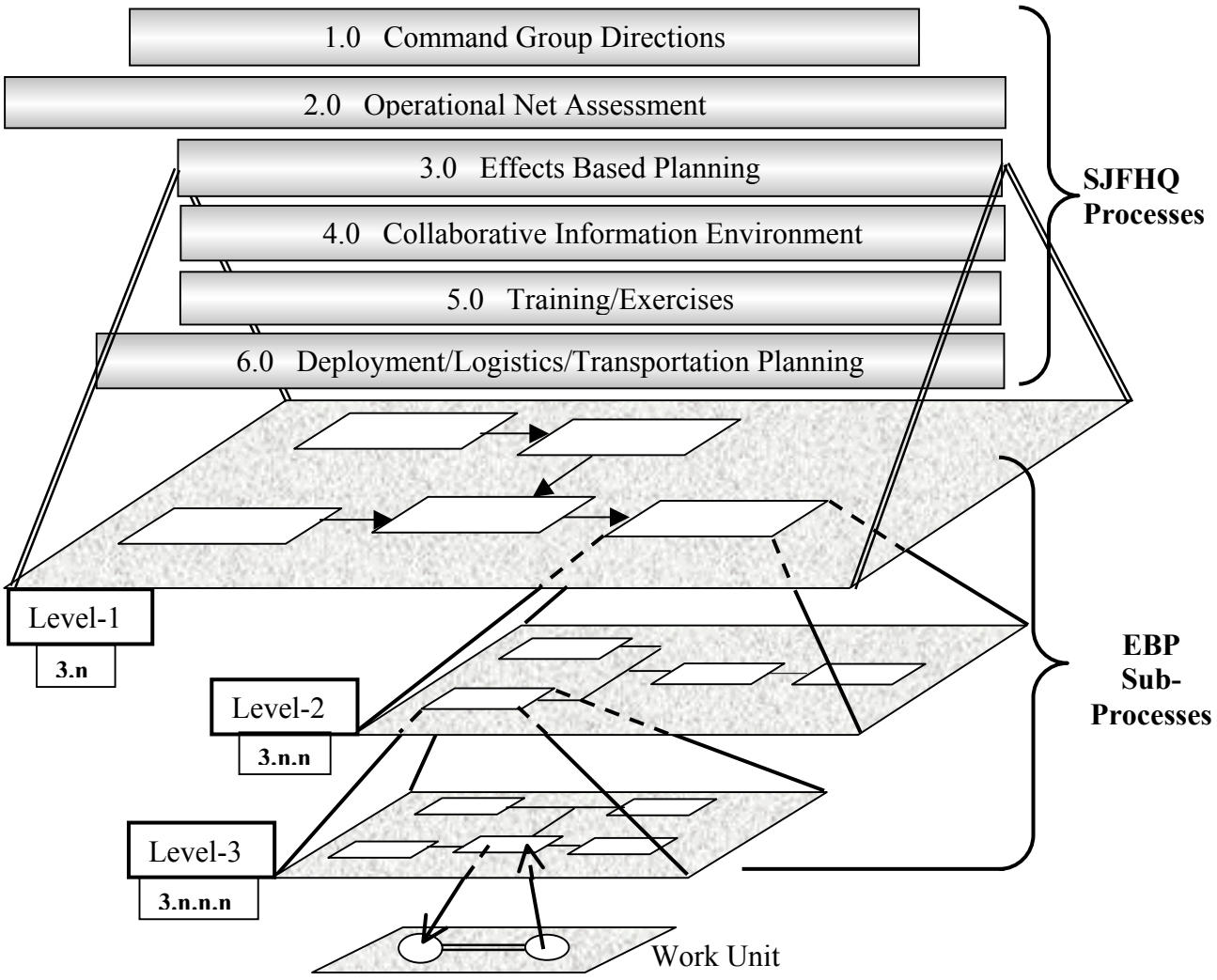


Figure 7. Core, Top-Level, Processes and Levels Structure.

Figure 7 shows the sub-process levels under Effects Based Planning. Under each sub-processes in Level-1 there are a number of Level-2 sub-processes, with further decomposition down to Level-3. Sub-processes are indicated by white boxes. A logical numbering scheme for all processes and sub-processes is used to track their relationships, for example:

3.0 Effects Based Planning
- 3.2 Mission Analysis
  - 3.2.8 Determine End State Objectives
    - 3.2.8.3 Develop Recommended PEL

The figure also shows a Level-3 sub-process sending a task to a work-unit. A large number of work-units represent the SJFHQ, the composition of each depending on the tasks assigned to them. The following section contains a table listing all processes and their work-units. A task can be sent to a work-unit only from a Level-3 sub-process.

There is a slight sense of time in the figure in the length and positions of the process bars. ONA originates farthest to the left because that process is ongoing almost continuously, long before a crisis is declared. Logistics and Transportation planning is also ongoing, although not as complete as ONA. Command Group Decisions will initiate all other processes.

4.2 Sub-Process Definitions

Appendix-1 contains the table that lists all sub-processes and their numbers. Table 2 shows a few rows from the first columns from that table for explanation purposes.

Table 2. Sub-Process Definitions

1st 2nd 3rd Lvl	Processes and Sub-Processes
Command Group Directions	
1.1	Assess National Guidance
1.1.1.1	Dummy
1.2	Assess AOR Plans
1.2.1.1	Dummy
1.3	Develop Initial Guidance
1.3.1	Assess Transition and Provide Guidance
1.3.1.1	Dummy
1.3.2	Commander's Intent Development
1.3.2.1	Develop Commander's Intent
1.3.2.2	Transmit Cdr's Intent for Mission Analysis

Command Group Directions (1.0) is the core/basic process. Develop Initial Guidance (1.3) is the third first-level sub-process, Commander's Intent Development (1.3.2) its second second-level sub-process, and Transmit Commander's Intent for Mission Analysis (1.3.2.2) its second third-level sub-process. This last is at Level-3, which sends that task directly to a task workgroup.

In reality, tasks can be sent to a task workgroup from any level but in the simulation, tasks can be sent to task workgroups only from the third sub-process level. Thus, when a higher-level process sends a task, it is necessary to put dummy levels in the simulation so that the task is sent from the appropriate level. This is the reason for the "Dummy" entries. They have no effect on simulation results, and are only present so that the controlling database can be set up correctly.

Table 3 includes the same rows as shown in Table 2 but shows the last columns from the master table. (The middle columns list personnel assigned to a task and are described in a later section of this report.)

Table 3. Example of Required Input Sources, Task Duration, External Delay, and Task Priority

Inputs From	Duration	Delay	Priority
SECDEF	1		10
RCC	0.5		10
SECDEF, 3.1.1.10	0.2		1
1.3.1.1, 1.1.1.1, 1.2.1.1	0.4		5
1.3.2.1	0.2		1

"Inputs From" refers to those sub-processes from which information must be received before the current sub-processes task assignment can begin. For the initial processes shown here, input must also be received from outside the SJFHQ organization, from the Secretary of Defense (and/or also the Chairman of the Joint Chiefs of Staff) and the Regional Combatant Commander. Note that input for one of the tasks must be received from one of process 3's sub-processes. Such interconnections are more easily seen in the process maps discussed below.

Duration is the estimated amount of time the task will require with full manning of the task workgroup. In a few instances, information must be requested from an organization outside SJFHQ before a task can be completed. Delay is the amount of time the task will have to idle if such a request must be made.

Priority is used to control the order in which personnel perform tasks, with 1 being the highest and 10 the lowest priority. Several priority 10 tasks can be on a person's desk at the same time and will be worked on in the order they arrive. Higher priority tasks will interrupt lower priority tasks.

4.3 Process Architecture Maps

A process architecture map is required at each sub-level. Figure 8 contains the first-level architecture map. Second- and third-level maps are large and are presented in the appendices. Examples of small sections of the lower-level maps are reproduced in the following sections with explanations.

The first-level map shows the 6 basic processes and their first-level sub processes. The arrows show the flow of information from one sub-process to those following it in time. As can be seen, the figure does not have a time flow, e.g. from top to bottom. The dashed boxes are processes that are outside this version of the simulation.

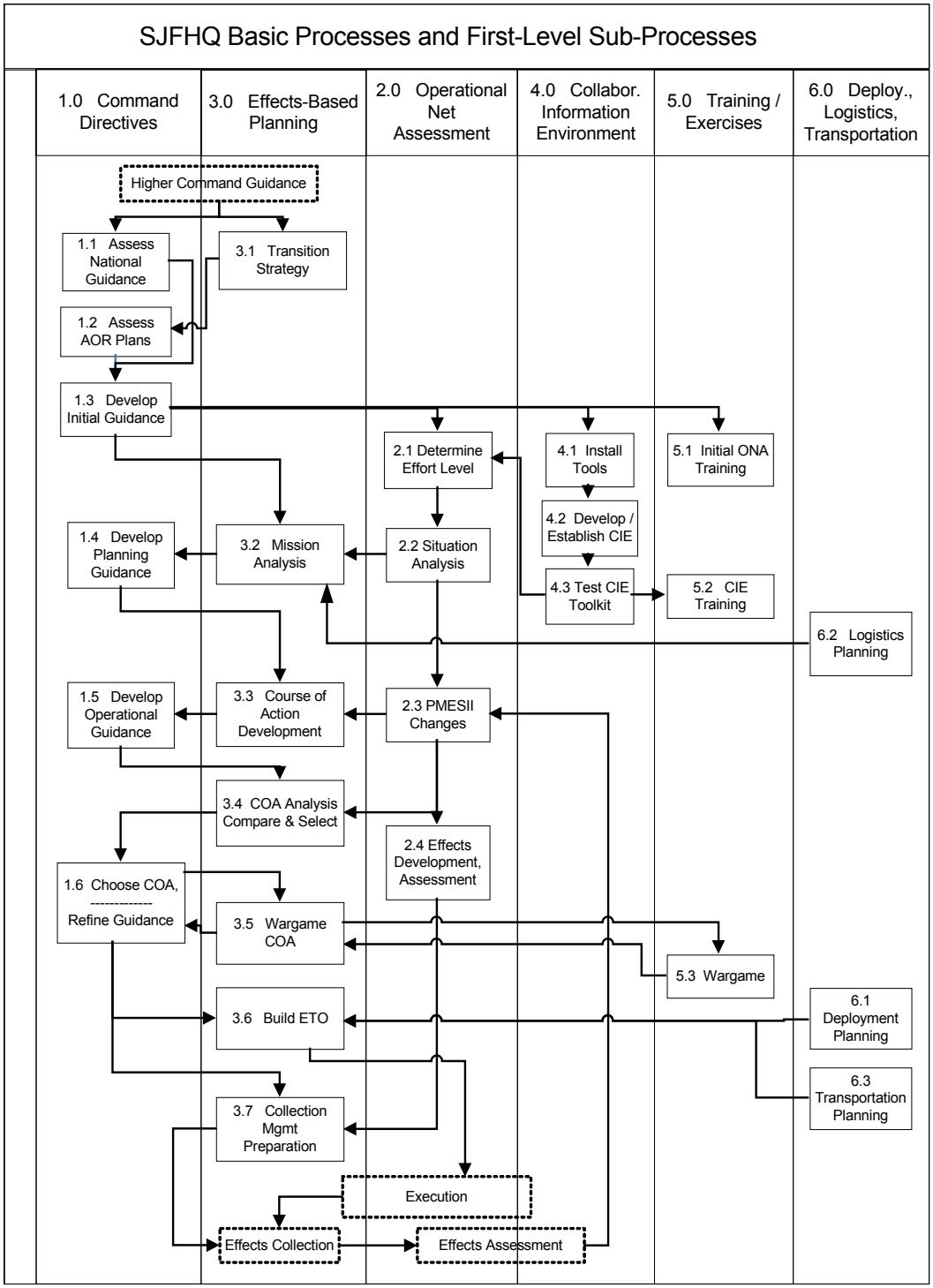


Figure 8. Basic and First-Level Processes and Information Flow

The processes are out of numerical order in the above figure because the connection arrows are better visually using the order shown.

Figure 9 shows a portion of the second-level sub-processes. In this figure, the arrows are more definitive with respect to information flow than is seen in the first-level diagram. This level of detail shown in this Second-Level map is probably the best for visualizing information flow, but does not identify the tasks that consume and produce information. Those tasks are seen in the third-level map, a portion of which is shown in Figure 10.

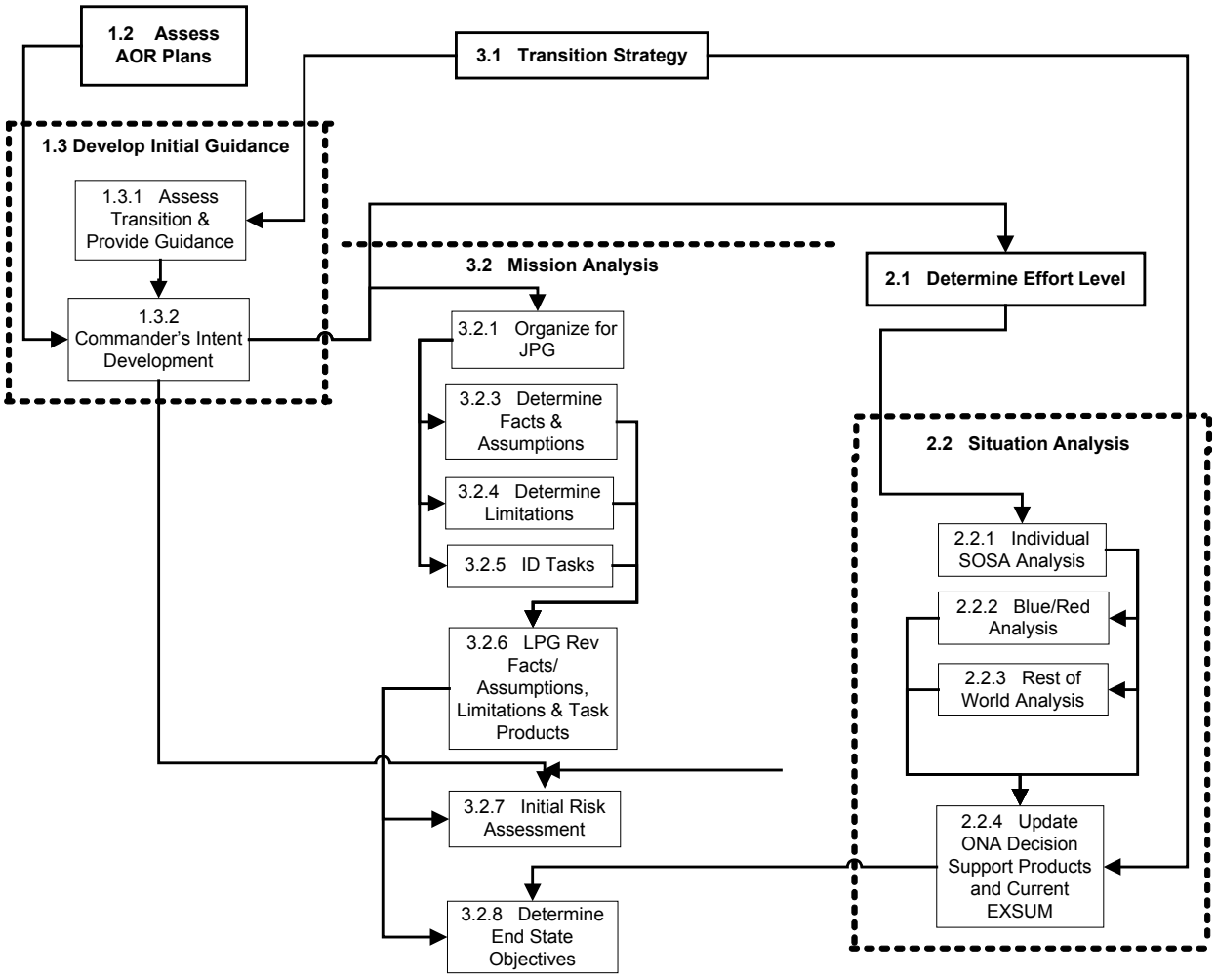


Figure 9. Example of a Portion of the Second-Level Sub-Processes

Not all arrows in Figure 9 are complete because they connect to process boxes that are not included. The heavy dashed boxes delineate First-Level sub-processes and enclose their included second-level processes.

Figure 10 shows a small portion of the Third-Level sub-process map. This map contains no titles, only sub-process numbers, because titles would take up too much space. (It will be seen in Appendix 2 that the second- and third-level maps take up three and five pages, respectively.)

Dashed lines are used for some of the information flows to reduce visual confusion. The type of line has no other significance. Sub-process blocks that are in sequence, and for which information flows from one to the next are in order of sequence, are placed in direct contact rather than showing an arrow in order to save space on the page.

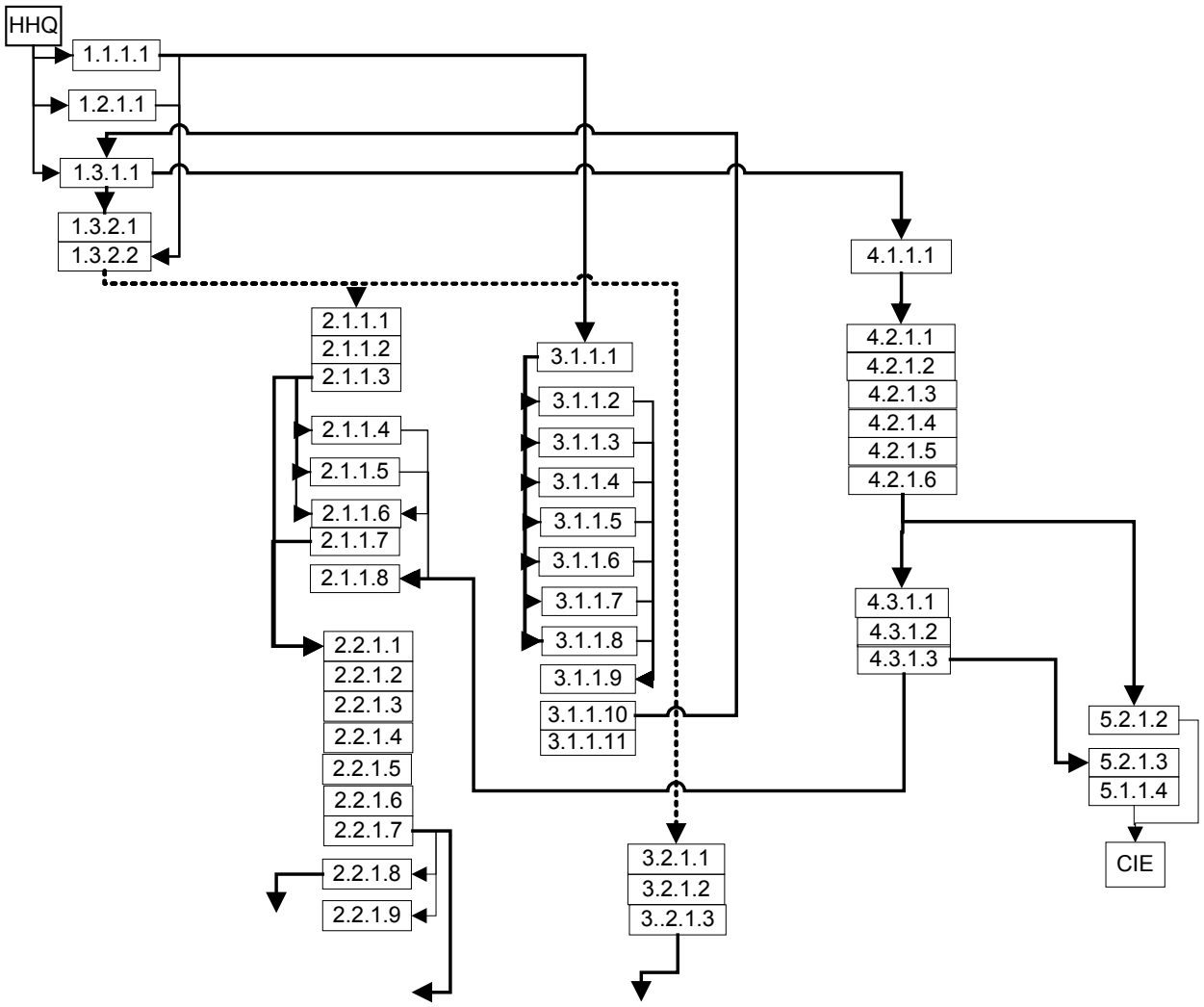


Figure 10. Third-Level Map of SJFHQ Sub-Processes

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5.0 PERSONNEL TASKING

5.1 Work Assignments

All tasks are "sent" to a group of defined individuals. The individuals are identified by number, as is shown in the following segment of the table from Appendix-1.

Table 4, Sample of Work Assignments and Personnel Tasking

2.1.1.1	Assess Intel, Cdrs' Guidance, Geospatial Info	35, 36, 37, 42, 43, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 64
2.1.1.2	Compare Situation & Intel with ONA Baseline	50, 51, 52, 53, 54, 55, 56, 57
2.1.1.3	Identify changes in Environment	50, 51, 52, 53, 54, 55, 56, 57

The titles of the numbered individuals are shown in the table in the following Section 5.2. The table also shows assignments of SJFHQ personnel to the Teams, Groups, and Cells as listed in the reference documents. This information, and SME knowledge, was used to define the personnel assignments shown in the table.

5.2 Assignments to Task Workgroups

The following Table 5 shows the various organizations and the people who are assigned to them as defined by the reference documents.

T=Team Member X=Assigned A=Augment/Support C=Coordinates L= Assigned Lead S=Secondary Lead **Position**		**Groups and Teams**												**Boards, Centers, Cells, Wrk Grps**											
		Command Group	Info Superiority Grp	Info Superiority Tm	ONA Section	Intel Section	IO Section	Eff Assess Cell	Operations Group	Operations Team	Logistics Group	Planning Group	Planning Team	Effects Work Group	KM Group	KM Team	JISC	JCMC	JCB (virtual)	JCB Work Group	JFE Work Group	TSTC	LCB (virtual)	Blue/Red Cell	JTF-JPG (virtual)	Effects Work Group	J KM Board	ONA Work Group
1	Director SJFHQ	X																									
2	Chief of Staff	X																									
3	Deputy Chief of Staff	X																									
4	Admin/Support Coord #1	X																				A					
5	Admin/Support Coord #2	X																				A					
6	Plans Chief											L	L									X		L			
7	Deploy Plans Officer											X	T									X		X			
8	Operational Law Planner											X	T								X	X					
9	Planner (Aerospace)				X							X	T											X			X
10	Planner (Army)				X							X	T											X			X
11	Planner (USMC)				X							X	T											X			X
12	Planner (Maritime)				X			X				X	T											X			X
13	Planner (Space-STO)				X							X	T														X
14	SOF Planner				X							X	T											X			X
15	Pol/Mil Planner				X							X	T	X							X		X	X	A		X
16	Blue/Red Planner #1				X							X	T	X				A						X	A		X
17	Blue/Red Planner #2				X							X	T	X				A						X	A		X
18	FP Planner (TBE/WME)				X							X	T									X	X		X		X
19	Operations Chief			A					L	L												L			X		
20	Aerospace Ops Officer #1				X				X	T											X	X			X		X

| | | |

5.3 Simulation Human Tasking Module

In order to accurately model the multitasking regime of each SJFHQ team member, a unique simulation block construct was developed that warrants some detailed explanation. The modeling constructs for this section are encapsulated in each Person's h-block, in a sub h-block called "Working On Assignments".

As assignment items are generated by the Tasks layer and sent to individual team members, they are assigned a priority attribute (generally from 1 to 15). In addition, each individual team member has a specific "priority cusp" that is used for prioritizing tasks within an individual's desktop. A combination of an assignment's priority value and the team member's priority cusp leads to the proper routing of assignments within the multitasking constructs. This comparison subsequently determines how an arriving assignment impacts other assignments already being worked on.

For multitasking purposes, an arriving assignment is given one of three classifications:

1. Normal Assignment
2. Standard Meeting
3. Priority Meeting or Assignment

Within the Priority sub h-block of Working On Assignments, an assignment's classification is determined by comparing the priority attribute with the priority cusp. If the attribute value has a higher priority (lower value) than the cusp, this is a Priority Meeting or Assignment. If it has a priority equal or lower than the cusp (higher value) than it is a Normal Assignment.

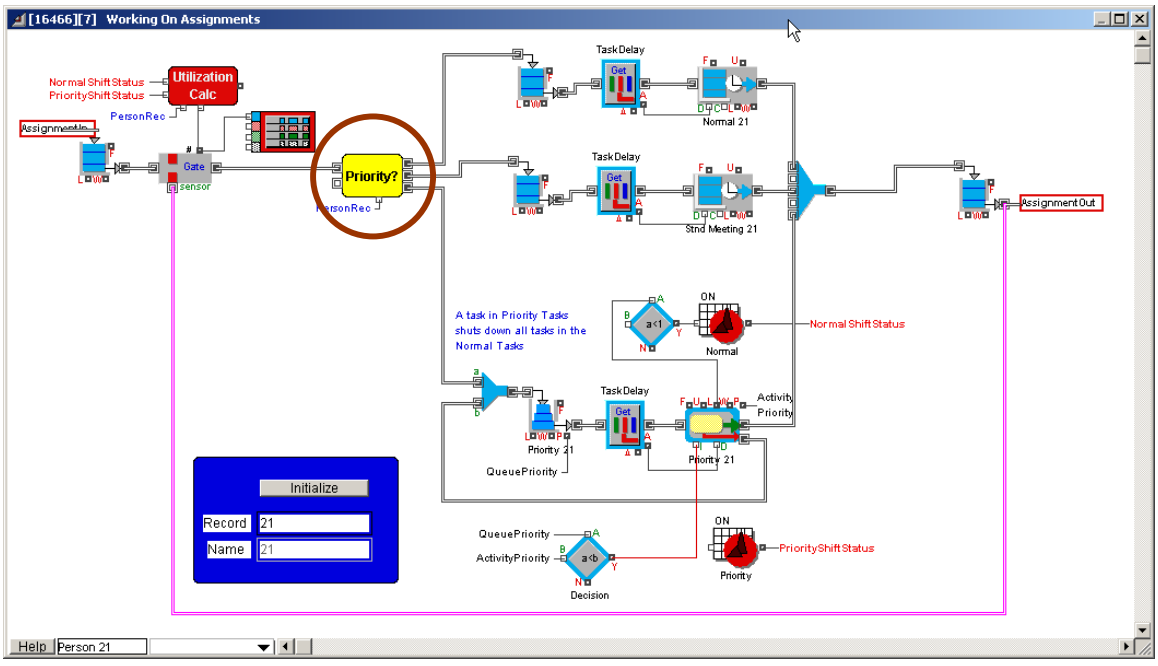


Figure 11. Model Constructs, Working On Assignments Sub H-Block (Person H-Block)

A further comparison is then made to determine if this is a Standard Meeting. It is important to note that for this iteration of the SJFHQ simulation a convention was adapted for all team members to have a cusp of 7. A value of 8 was then adapted for all assignments that were to be classified as a Standard Meetings. This priority-to-cusp construct is anticipated to be more fully leveraged in later model versions.

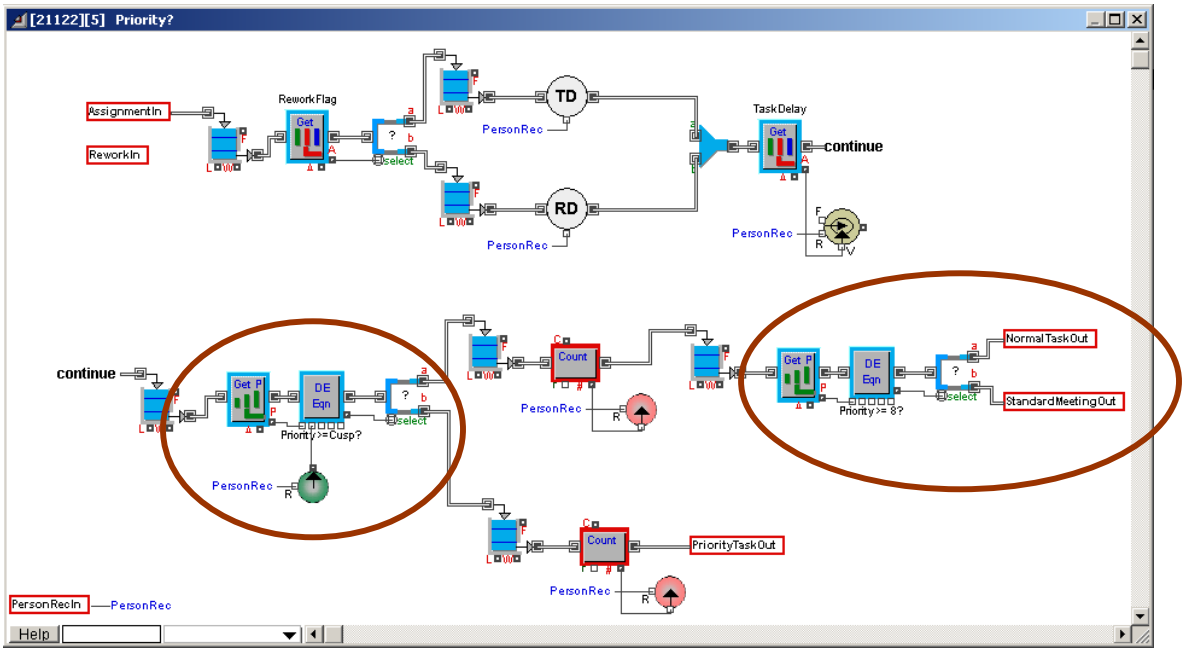


Figure 12. Model Constructs, Priority Sub H-Block (Working On Assignments)

Normal Assignments: Normal assignments are considered multi-tasking equals for completion by the team member. A standard Extend Activity, Multiple block is utilized with the "Simulate multitasking activity" option set to On. The related Help section for this block provides the following description for how multitasking delays are handled:

> *When selected, the processing time of each item will be dynamically changed based on the number of items in the Activity. This will simulate the behavior of a single, shared resource among all of the items in the activity. If there are two items in the activity, the processing for each item will be twice as long as the dialog indicates, if there are three items the processing will be three times as long and so on. This can be used to easily simulate a single worker that has many tasks to perform, but can only do one at a time . . . ."*

Standard Meetings: Standard Meeting assignments are time-specific assignments that an individual would typically participate in from their desk (such as a on-line collaboration). Because of this decentralized involvement, Normal multitasking desktop activity can (and typically does) continue. From a model construct point of view, the Standard Meeting assignments are routed to a separate Extend Activity, Multiple block, but in this case the multitasking option is not selected so that involvements start and end as scheduled. Delay times

in the Normal Assignments activity block continue to progress in parallel with Standard Meeting Assignments.

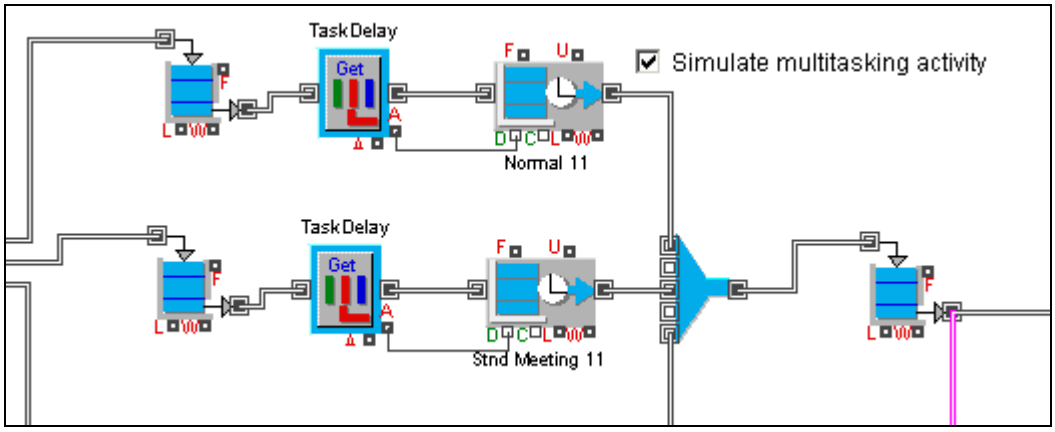


Figure 13. Normal Assignments (top path) and Standard Meeting (bottom path)

Priority Meetings or Assignments: Priority Meetings and Assignments are handled in a third path of modeling constructs. If an assignment enters this area, all activities in the Normal and Standard Meetings area are set aside (stop processing), and the team member is assumed to be completely focused on the Priority assignment until completion.

The shutdown of the Normal and Standard Meeting activity is accomplished as a part of the daily Shift blocks. If an item enters the Priority activity block, the Shift block receives a value greater than zero from the activity length connector and interprets this as a signal to shutdown.

The priority construct can also accommodate the possibility of a team member having more than one priority assignment on their desk at a time. If an individual is currently working on a priority assignment when another arrives, a comparison is made to the priority attribute values. The assignment with the highest priority (lower value) will be focused on first, with the arriving assignment able to "pre-empt" the current task if necessary. Assignments with equal priority values are handled as FIFO.

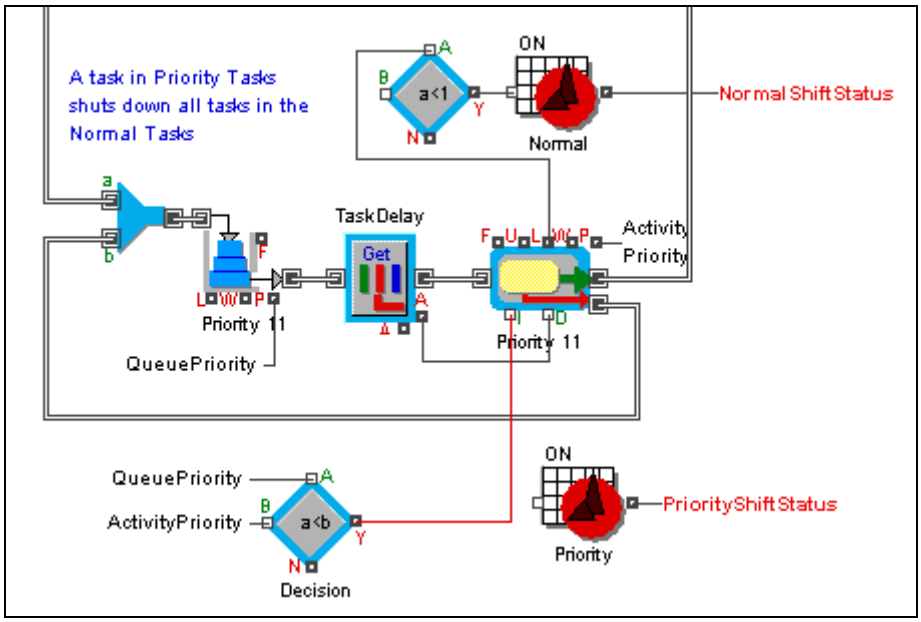


Figure 14: Priority Meetings and Assignments with Pre-emptive

6.0 SJFHQ SIMULATION

The conditions for which the simulation is set up are:

- SJFHQ operating within a Regional Combatant Commander (RCC) staff.
- Pre-crisis phase of operations where an existing ONA has a strong degree of relevance and Indications and Warnings intimate an impending crisis.
- All personnel are fully capable of performing assigned tasks.
- All low-priority tasks are worked in the order assigned regardless of deadlines.
- All personnel assigned to a task must work their full task-time before task completion.
- Tasks are always completed after being interrupted by meetings or shifts.
- A task can begin when only a fraction of assigned personnel are available.

6.1 Simulation Assumptions

Shifts

Each team member is assigned a specific shift category that governs the amount of time in a day that they are working and completing assignments. In this iteration, shifts of 4, 8, 12 and 16-hour categories are available. Team members are also assigned a specific shift start time that occurs seven days a week (no days off).

For simplification, this shift duration is modeled as a single block of time (in minutes), without any stop or start interruptions such as meal breaks. Thus, if a team member has a twelve-hour shift starting at 7:00 AM, and a twelve-hour shift is defined as 720 minutes, the shift will end at 7:00 PM.

Skill Levels

Each team member is assigned one specific skill level category. Each category has a factor that is then mathematically utilized to adjust the processing time required to complete any assignment.

In this iteration, skill level categories are High, Normal, and Low. A Normal skill level has a factor of 1, resulting in no adjustment of the predicted processing time. High and Low skill levels have the delay times adjust -/+ 25% respectively.

Sub-Processing Cycles

A modeling architecture has been constructed that allows “repeating” tasks on a daily basis. This mimics the typical time requirements team members must commit to regular meetings and daily reports.

In the sub-process layer, a parameter called Cycles is available to reflect a daily spawning of related Tasks. The top layer (Focus) generates new items each day for every record in it’s related table. After the first day, a Focus item will query the database to see if it has any related Sub-Process records with the Cycles parameter as true. If it does not find any such records, the Focus item is destroyed without any logging or further use.

If a Focus item does find Sub-Process records with cycles, it goes through it's normal spawning routines for related Process records, where a similar "query and destroy" routine is performed. This filtering routine eventually only spawns the needed layer items to complete the daily cycled tasks.

It is possible, depending on the workload of individuals, for daily repeating requirements to be unfinished at the end of their shift, eventually leading to an inappropriate backlog of assignments for this team member. No modeling constructs have been implemented to resolve this. This result should be apparent by noting a high utilization rate for a team member and long completion times for these daily assignments. In this iteration, most of the repeating daily requirements are appropriately represented as Standard Meetings which, by separate routing (Priority 8), will alleviate (for the most part) this nuance.

External Delays and Rework

Model and database constructs are in place to represent the likelihood of SJFHQ output needing external processing or approval, with potential rework of the product back at the same level of departure.

External delays and rework can be modeled at any layer except the individual assignment layer (it is assumed that individual assignments are collaborative efforts towards a Task completion, where external processing/approval and identification of rework could first take place). These probabilities and unique parameters are available in each of the definitions tables in the database.

If rework is triggered, all related sub-layer items are re-spawned with a rework flag. Processing times are calculated with a rework factor applied. Completion towards all precedence events are held until the rework is successful. Rework can also occur multiple times within any context and is logged as part of the log record. In this iteration of the model no External Delays for Rework parameters are considered.

6.2 Simulation Setup and Control

The simulation runs on a set of connected database tables that contain architecture, process parameters, and work assignments. The following presents those tables and brief explanations of each.

Simulation Setup

Tables 6 and 7 start and stop the simulation. The first four rows, and their content types, are required by the Extend database simulation. All tables are created in Excel using the Database Add In tool and imported. Numbered Fields as the first column of data are required.

Notes:

1) Set the approximate correct end time for better team member utilization metrics
2) The random seed will be modified with each import. A random seed of "0" makes every run unique.
3) The current model constructs require that Time Units be in Minutes.

Note that there are established parent/child relationships. These are shown by color codes, with the parent is green and the child is beige. These relationships must be adhered to or the simulation will not run. Note that italics in the title cell indicate a child (Time Units is italicized but difficult to discern in this printing).

Table 6. Simulation Setup

Table	Simulation Setup				
Notes					A seed of zero makes each run unique.
	real	real	integer	string	integer
Fields	**Model Start Date**	**Model End Date**	**Number of Runs**	***Time Units***	**Random Seed**
1	8/23/04 0:00	9/15/04 0:00	1	Minutes	1172285

Table	Simulation Time Units
Notes	
	string
Fields	**Model Time Unit**
1	Minutes
2	Hours
3	Days
4	Weeks

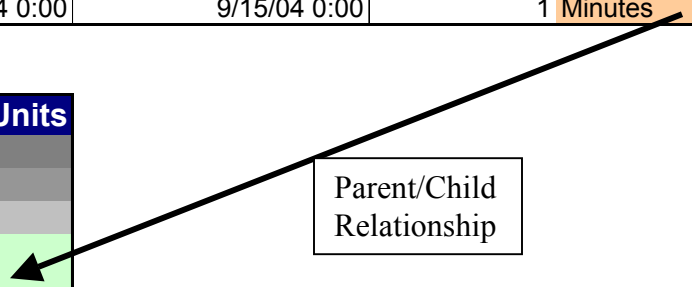


Table 7. Time-Unit Definitions

The following seven pages describe the following SJFHQ-specific databases:

- Team Members, Skill Levels, Shift Durations
- Breakdown Tables
- Focus, Process, Sub-Process Precedence
- Task Breakdown
- Task Precedence
- Task Groups
- Indexed Fields

Only the headers and a few rows of each table are shown.

Cells that are colored red should not be modified.

Team Members, Skill Levels, Shift Durations

Notes:

1) The Skill Level field is a child field to the Skill Level field in the *Skill Levels* table.
2) The Shift Duration field is a child field to the Shift Duration field in the *Shift Durations* table.
3) Catch block is routing internal to the model, not to be changed.
4) Skill level is used as a multiplier to modify the time it takes for an individual to complete a task.
5) A continuous work shift is the allowed start time and duration for each day's work. Output reported here uses a 16 hour shift starting at 0600.
6) Priority cusp is the priority boundary between multitasking and interrupt tasks. 7 is the current boundary.

Table 8. Team Members

Table	Team Members						
Notes	List of team members in SJFHQ (65 total)		Catch block number in h-block	Used as a factor for calculating task delays			
	string	string	integer	string	real	string	real
Fields	**Name**	**Description**	**Catch Block**	***Skill Level***	**Shift Start Time**	***Shift Duration***	**Priority Cusp**
1	Director SJFHQ		27360	Normal	7:00	12 hours	7
2	Chief of Staff		21631	Normal	7:00	12 hours	7
3	Deputy Chief of Staff		22031	Normal	7:00	12 hours	7

Table	Skill Levels	
Notes		
	string	real
Fields	**Skill Level**	**Factor**
1	High	0.75
2	Normal	1
3	Low	1.25

Table 9. Skill Levels

Table	Shift Durations	
Notes		
	string	real
Fields	**Duration**	**Minutes**
1	4 hours	240
2	8 hours	480
3	12 hours	720
4	16 hours	960

Table 10. Shift Durations

Breakdown Tables

Notes: 1. Each of the breakdown tables has a child field with a parent from the higher layer table. These tables establish the relationships between the simulation levels.

2. External delay occurs if that processes needs to request information from an outside of SJFHQ entity.

Tables 11. Core Processes and Sub-Processes Information Tables

Table	Focus		
Notes			
	string	real	real
Fields	**Focus**	**External Delay (Approval or Add'l)**	**Probability for Rework**
1	Command Group Directions	0	0
2	ONA	0	0

Table	Processes				
Notes					
	string	integer	string	real	real
Fields	**Process**	**Catch Block**	***Focus Name***	**External Delay (Approval or Add'l)**	**Probability for Rework**
1	1.1 Assess National Guidance	0	Command Group Directions	0	0
2	1.2 Assess AOR Plans	0	Command Group Directions	0	0

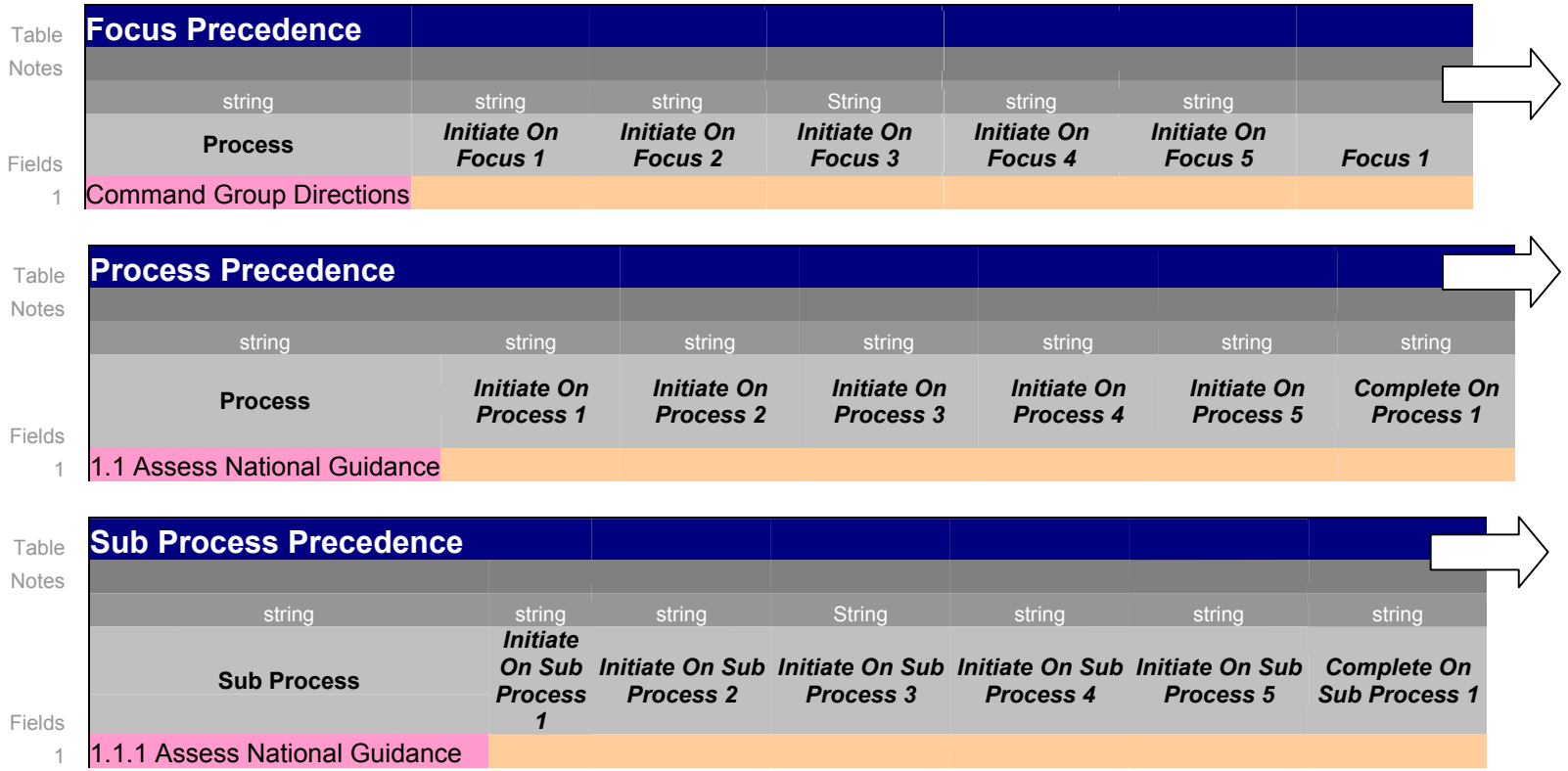
Table	Sub Processes					
Notes						
	string	integer	string	string	real	real
Fields	**Sub Process Name**	**Catch Block**	***Process Name***	***Cycles?***	**External Delay (Approval or Add'l)**	**Probability for Rework**
1	1.1.1 Assess National Guidance	0	1.1 Assess National Guidance		0	0
2	1.2.1 Assess AOR Plans	0	1.2 Assess AOR Plans		0	0

Focus, Process, Sub-Process Precedence

Notes:

1. These tables specify which other processes (initiate on) must supply information before this process can begin. In the current version of the model all initiating processes are at the task level.
2. Initiate On & Complete On Fields are child fields to the first field in the corresponding breakdown table.
3. The first field in the precedence tables is synchronous to the first field in the corresponding breakdown table.

Tables 12. Processes Precedence



Task Breakdown Table

Notes:

1. This table establishes relationships between tasks and sub-processes in the same format as the higher-level tables.
2. In addition, it contains the priorities, duration times for each task, and the SJFHQ individuals who will be assigned to work on the tasks.
3. Daily start time is used only for tasks that are scheduled meetings. All other tasks begin when their "Initiate On" processes are completed.

Table 13. Task Breakdown

Table	Tasks				
Notes					
	string	string	string	integer	string
Fields	**Task**	**Task Description**	***Sub Process***	**Team Member Assigned**	***Task Group Assigned***
1	1.1.1.1	Assess National Guidance	1.1.1 Assess National Guidance	0	1, 2, 3, 4
2	1.2.1.1	Assess AOR Plans	1.2.1 Assess AOR Plans	0	1, 2, 3, 4
3	1.3.1.1	Assess Transition and Provide Guidance	1.3.1 Assess Transition and Prov	0	1, 2

Continuation of Table →

real	real	real	real	real	real
Daily Start Time	**Priority**	**Duration (Hrs)**	**External Delay (Hrs)**	**Probability for Rework**	**Rework Delay Factor**
0:00	10	1	0	0	0
0:00	10	0.5	0	0	0
0:00	10	0.2	0	0	0

Task Precedence

1. Initiate On & Complete On Fields is a child field to the first field in the *Task* table.
2. The first field in the precedence tables is synchronous to the first field in the *Task* table.

Table 14. Task Precedence

Table	Task Precedence							
Notes								
	string	string	string	string	string	string	string	string
Fields	**Task**	***Initiate On Task 1***	***Initiate On Task 2***	***Initiate On Task 3***	***Initiate On Task 4***	***Initiate On Task 5***	***Complete On Task 1***	***Complete On Task 2***
1	1.1.1.1							
2	1.2.1.1							
3	1.3.1.1	3.1.1.10						
4	1.3.2.1	1.3.1.1	1.1.1.1	1.2.1.1				
5	1.3.2.2	1.3.2.1						
6	1.4.1.1	3.2.20.6						
7	1.4.1.2	1.4.1.1						
1	1.4.2.4	1.4.2.3						
2	1.5.1.1	3.3.10.8						
3	1.5.1.2	1.5.1.1						
4	1.5.1.3	1.5.1.2						
5	1.6.1.1	3.4.4.1						

Task Groups Table

Notes:

1. This table establishes the groups of SJFHQ members that work on each task. It has a parent/child relationship with the "Task Group Assigned" column in the Task Breakdown Table (through string identity). Because of this relationship, the same group can be used for many tasks and only need be entered once in this table.
2. Group Name taken from original description.
    a. Parent: Must be unique
3. Fields (Id 1 – 65) correspond to record number in *Team Members* table.
    a. Set to "1" if in group, set to "0" if not in group.

Table 15. Task Groups Assignments

Table	Task Groups					
Notes	Groups that collaborate on tasks (builds assignments table)	Field Name (ID#) refers to the record number in Team Members table				
	string	integer	integer	integer	integer	integer
Fields	**Group Name**	**ID 1**	**ID 2**	**ID 3**	**ID 4**	**ID 5**
1	All Hands	1	1	1	1	1
2	1, 2, 3, 4	1	1	1	1	0
3	1, 2	1	1	0	0	0
4	1, 2, 3, 4, 6, 19, 29, 60	1	1	1	1	0
5	1, 2, 3	1	1	1	0	0
6	1, 6, 10, 35	1	0	0	0	0
7	1, 3, 6, 9, 10, 11, 12, 13, 14, 15	1	0	1	0	0
8	35, 36, 37, 42, 43, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 64	0	0	0	0	0
9	50, 51, 52, 53, 54, 55, 56, 57	0	0	0	0	0

Indexed Fields

Notes:

1. This table keeps track of all parent/child relationships.

Table 16. Indexed Fields (Parent-Child Relationships)

Table	Indexed Fields					
Notes	Name of Table with Child Field	Name of Field containing non-	Name of Table	Name of Field	Enter a 1 if the child field	
	string	string	string	string	integer	string
Fields	**Child Table**	**Child Field**	**Parent Table**	**Parent Field**	**Optional**	**Type**
1	Assignments Log	Rework?	Yes	Status	1	
2	Assignments Log	Task	Tasks	Task	1	
3	Assignments Log	Team Member Assigned	Team Members	Name	1	
4	Focus Log	Focus	Focus	Focus	1	
5	Focus Precedence	Complete On Focus 1	Focus	Focus	1	
6	Focus Precedence	Complete On Focus 2	Focus	Focus	1	
7	Focus Precedence	Complete On Focus 3	Focus	Focus	1	
8	Focus Precedence	Complete On Focus 4	Focus	Focus	1	
9	Focus Precedence	Complete On Focus 5	Focus	Focus	1	
10	Focus Precedence	Initiate On Focus 1	Focus	Focus	1	
11	Focus Precedence	Initiate On Focus 2	Focus	Focus	1	

6.3 Simulation Output

A large number of tables are available for simulation output. The following tabs in Excel and in the Extend Viewer make these tables, and the above-described tables, available.

Table 17. Viewer Tabs for Simulation Output Access

Table	Viewer Tabs	
Notes		
	string	string
Fields	**Tab Name**	**Tab Item**
1	Table Outline	Excel Tabs
2	Support Tables	Indexed Fields
3	Support Tables	Yes
4	Support Tables	Simulation Setup
5	Support Tables	Simulation Time Units
6	Support Tables	Viewer Tabs
7	Team Members	Shift Durations
8	Team Members	Skill Levels
9	Team Members	Team Member Metrics
10	Team Members	Team Members
11	Task Groups	Task Groups
12	Breakdowns	Focus
13	Breakdowns	Processes
14	Breakdowns	Sub Processes
15	Breakdowns	Tasks
16	Precedence	Focus Precedence
17	Precedence	Process Precedence
18	Precedence	Sub Process Precedence
19	Precedence	Task Precedence
20	Logs	Focus Log
21	Logs	Process Log
22	Logs	Sub Process Log
23	Logs	Task Log
24	Logs	Assignments Log

The following shows examples of the principal tables that are used for time analysis and for personnel workload analysis. These are the tables used to develop the results reported in this report.

Focus, Process & Sub Process Logs

Notes:

1. These tables contain various numbers that keep track of the relationships between the process levels, and record process and task assignment numbers to cross-correlate between levels.
2. The start and complete time for all processes, and the processing time are included. The time between the end of a shift and beginning of the next shift is included if the processes tasks are not completed by the end of a shift.

Tables 18. Logs of Process Statistics from a Simulation Run

Table	Focus Log							
Notes								
	string	integer	integer	integer	integer	real	real	real
Fields	*Focus*	Batch ID	Rework Count	Processes Assigned	Processes Complete	Start Time	Complete Time	Process Time (hrs)
1	Command Grou	1	0	6	6	8/23/04 0:01	9/12/04 13:36	493.58

Table	Process Log								
Notes									
	string	integer	integer	integer	integer	integer	real	real	real
Fields	*Process*	Focus Log Record	Batch ID	Rework Count	Sub-Processes Assigned	Sub-Processes Completed	Start Time	Complete Time	Process Time (hrs)
1	1.1 Assess Nati	1	1	0	1	1	8/23/04 0:01	8/23/04 8:00	7.98

Table	Sub Process Log								
Notes									
	string	integer	integer	integer	integer	integer	real	real	real
Fields	*Sub Process*	Process Log Record	Batch ID	Rework Count	Tasks Assigned	Tasks Completed	Start Time	Complete Time	Process Time (hrs)
1	1.1.1 Assess Na	1	1	0	1	1	8/23/04 0:01	8/23/04 8:00	7.98

Task & Assignment Log

Notes:

1. See notes on immediately preceding page
2. Also included here are the SJFHQ team members assigned to each task.

Table 19. Task Log

Table	Task Log							
Notes								
	string	string	integer	integer	integer	integer	string	integer
Fields	*Task*	Task Description	Sub Process Log Record	Process Log Record	Rework Count	Batch ID	*P or SP Rework?*	Assignments Assigned
1	1.1.1.1	Assess Nationa	1	1	0	1		4

Continuation of Table →

integer	real	real	real
Assignments Completed	Start Time	Complete Time	Process Time (hrs)
4	8/23/04 0:01	8/23/04 8:00	7.98

Table 20. Personnel Assignments to Tasks Log

Table	Assignments Log						
Notes							
	string	integer	integer	integer	string	integer	string
Fields	*Task*	Task Log Record	Sub Process Log Record	Process Log Record	*Team Member Assigned*	Batch ID	*Rework?*
1	1.1.1.1	1	1	1	Director SJFHC	1	

Continuation of Table →

real	real	real
Start Time	Complete Time	Process Time (hrs)
8/23/04 0:01	8/23/04 8:00	7.98

Team Member Metrics

Notes:

1. This table provides a summary of utilization of each SJFHQ team member.
2. Sum Delay Time is the total time spent working on tasks.
3. The time and Utilization have had the overnight times subtracted out to produce accurate results.

Table 21. SJFHQ Team Member Work Metrics

Table	Team Member Metrics				
Notes					
	string	real	real	real	real
Fields	Name	Overall Utilization	Normal Tasks Assigned	Priority Tasks Assigned	Sum Delay Times (hrs)
1	Director SJFHQ	0.161594203	20	48	45.1
2	Chief of Staff	0.164130435	17	49	45.8
3	Deputy Chief of Staff	0.158333333	17	49	44.2
4	Administrative/Support Coordinator #1	0.130072464	3	46	36.4
5	Administrative/Support Coordinator #2	0	0	0	0
6	Plans Chief	0.413043478	39	107	114

7.0 SIMULATION RESULTS

The following results have been extracted from the Task Log table and the Assignments Log table. These tables were used rather than the Team Member Metrics in order to subtract out overnight hours when they were included as process time because that task was not completed before the end of a shift.

The total simulation run time for a single run was approximately 3 seconds.

Overarching statistics for the run on which these results are based are:

- First task, number 1.1.1.1, initiated at 0600 on 23 Aug.
- Last task, number 3.6.1.14, completed at 1015 on 8 Sep.
- Total shift work hours were 260.
- Total number of individual tasks completed was 6061.

Total shift hours was determined by subtracting out the daily non-shift time of eight hours each day from the total time between initiation of the first task to completion of the last task.

The number of individual tasks appears at first glance to be very high. The number is this large because large numbers of personnel are assigned to many of the 377 tasks, yielding a large number of individual assignments.

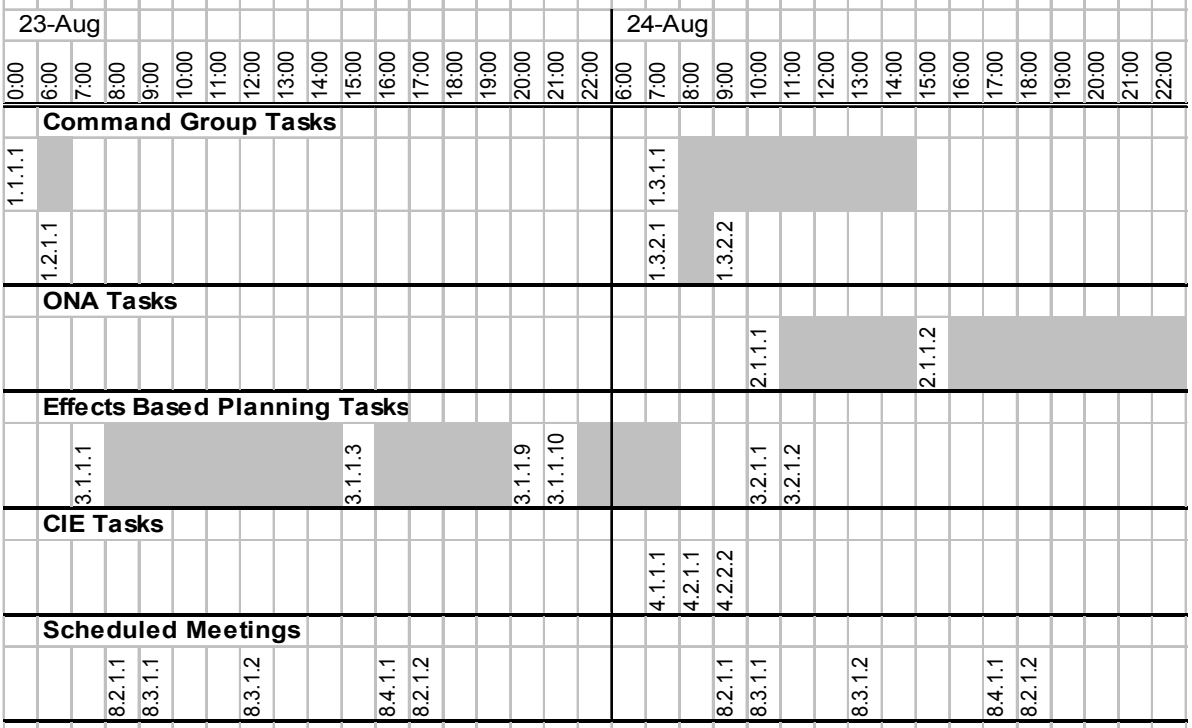
Following are three sets of results information:

1. A diagram showing a time line of some of the tasks that were accomplished during the first two days of simulation time
2. A portion of the Task Log for these same processes
3. A plot of the number of tasks on a desktop as a function of time
4. Work statistics for each SJFHQ individual.

7.1 Simulation Output Tables

The following pages present tables of simulation output results.

Table 22. Time History of a Few of the SJFHQ Tasks



A 16 hour work day is used.

The simulation begins on 0000 of 23-Aug but work does not begin until 0600 on the 24th

Tasks that take longer than one hour are indicated by the gray area following the task number.

The start and stop times are only approximate, for illustration purposes only.

See the task diagrams for connections between the processes.

The times indicated in the diagram are only approximations of the actual times.
The diagram is too coarse to represent times accurately.

	23. Simulation Output Task Log								
Task	Task Description	Sub-Proc Rec	Proc Rec	# Assigned	# Completed	Start Time	End Time	Process Time	Assign Time
1.1.1.1	Assess National Guidance	1	1	4	4	8/23/04 0:01	8/23/04 7:00	6.98	1.0
1.2.1.1	Assess AOR Plans	2	2	4	4	8/23/04 0:01	8/23/04 7:00	6.98	0.5
3.1.1.1	Review Orders, Plans & Intel Summaries	23	11	23	23	8/23/04 7:00	8/23/04 14:45	7.75	5.0
3.1.1.2	Time Analysis	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	1.0
3.1.1.3	Define Battlespace Environment	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	0.5
3.1.1.4	Situation Asssessment	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	0.5
3.1.1.5	Validn of Current Plans, Orders	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	1.0
3.1.1.6	Key Node Impact Evaluation	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	1.0
3.1.1.7	Receive Intel, JIPB, ONA Summaries	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	1.0
3.1.1.8	Receive Current Situation Briefing	23	11	22	22	8/23/04 14:45	8/23/04 19:57	5.20	0.7
3.1.1.9	Prepare and Pre-brief Transition Briefing	23	11	3	3	8/23/04 19:57	8/23/04 20:57	1.00	1.0
3.1.1.10	Brief Formal Transition Briefing	23	11	3	3	8/23/04 20:57	8/24/04 6:57	10.00	2.0
1.3.1.1	Assess Transition and Provide Guidance	3	3	2	2	8/24/04 6:57	8/24/04 7:09	0.20	0.2
4.1.1.1	Install CIE Tools	61	18	2	2	8/24/04 7:09	8/24/04 8:24	1.25	1.0
4.2.2.1	Develop Baseline Structure	62	19	6	6	8/24/04 8:24	8/24/04 9:54	1.50	1.0
4.2.2.2	Collaboration Requests	62	19	6	6	8/24/04 9:54	8/24/04 10:54	1.00	1.0
1.3.2.1	Develop Commander's Intent	4	3	8	8	8/24/04 7:09	8/24/04 9:39	2.50	0.4
1.3.2.2	Transmit Cdr's Intent for Mission Analysis	5	4	1	1	8/24/04 9:39	8/24/04 9:51	0.20	0.2
2.1.1.1	Assess Intel, Cdrs' Guidance & Geospacia	9	7	18	18	8/24/04 9:51	8/24/04 15:21	5.50	4.0
2.1.1.2	Compare Situation & Intel with ONA Baseli	9	7	8	8	8/24/04 15:21	8/25/04 8:36	17.25	8.0
2.1.1.3	Identify changes in Environment	9	7	8	8	8/25/04 8:36	8/25/04 12:36	4.00	4.0
3.2.1.1	Develop detailed planning timeline	24	12	1	1	8/24/04 9:51	8/24/04 10:21	0.50	0.5
3.2.1.2	Develop personnel responsibilities to BCC	24	12	1	1	8/24/04 10:21	8/24/04 10:39	0.30	0.3
3.2.1.3	Assemble and Post Products	25	12	6	6	8/24/04 10:39	8/24/04 10:51	0.20	0.2
8.2.1.1	Morning Operations Tour	72	29	12	12	8/23/04 7:00	8/23/04 8:00	1.00	1.0
8.2.1.2	Evening Operations Tour	72	29	12	12	8/23/04 17:00	8/23/04 18:30	1.50	1.0
8.3.1.1	Commander's Morning Update	73	30	20	20	8/23/04 8:30	8/23/04 9:30	1.00	1.0
8.3.1.2	Higher Headquarter's Meeting	73	30	12	12	8/23/04 12:00	8/23/04 12:30	0.50	0.5
8.4.1.1	Joint Coordination Board Meeting	74	31	14	14	8/23/04 16:30	8/23/04 17:30	1.00	1.0

The above table is an extraction of a few tasks from the Task Log. A column that shows the assigned task duration has been added for reference. The tasks included in this table are those that occur early in SJFHQ operation (see third-level sub-process architecture map above).

Note that the parallel processes 3.1.1.2 to 3.1.1.8 start and stop at the same times, as they should.

In some cases the processing time is much longer than the assigned duration time. Reasons for this are as follows:

1.1.1.1 and 1.1.1.2: Included in the process time is the duration from simulation startup to the beginning of the workday the next morning.

3.1.1.10 and 2.1.1.2: The task was not completed before the end of the shift so the processing time includes the overnight delay.

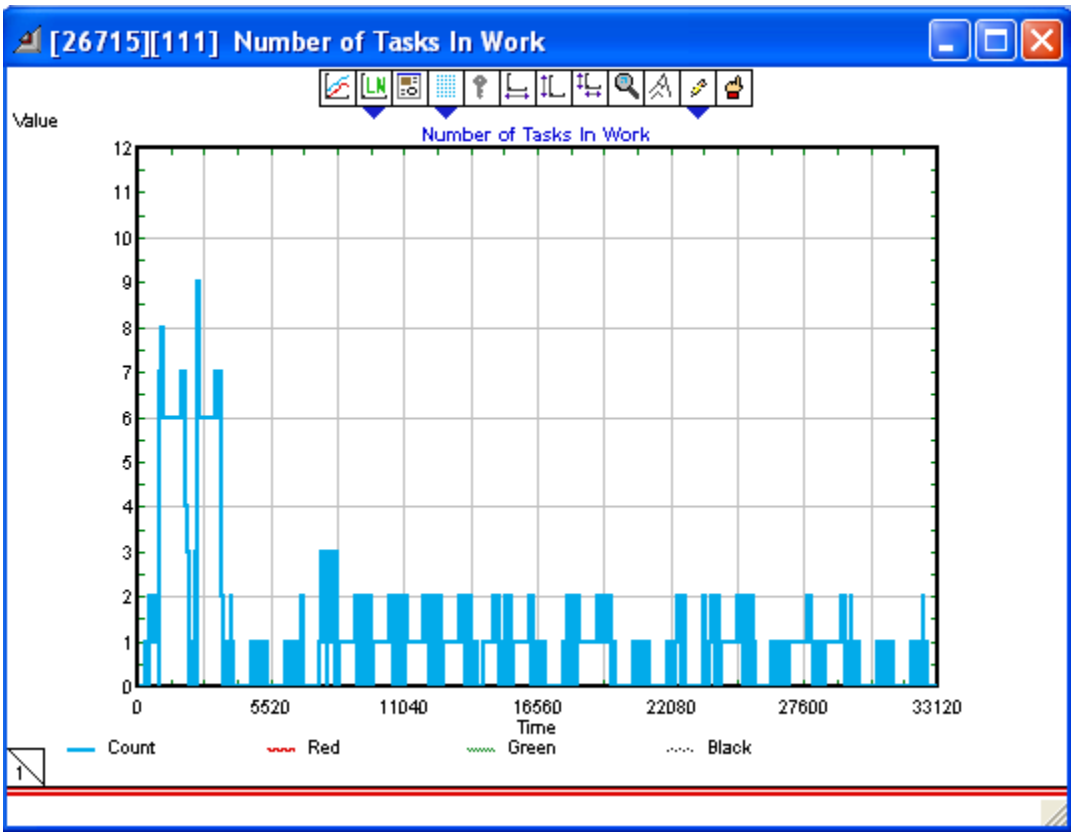
3.1.1.2 through 3.1.1.8: Increased times are due to multi-tasking delays. In these cases, due to the Pol/Mil planner having to go to a large number of meetings.

3.1.1.9 is a high priority task, so it is completed before multi-tasking work is completed on tasks 3.1.1.2 through 3.1.1.8.

As has been noted previously in this report, the output of Team Member Metrics does not include these non-shift time artifacts.

The following Figure 15 shows the number of tasks assigned to the Pol/Mil planner as a function of time. This individual was chosen because that is one of the busiest position in the group.

Figure 15. Time History of Number of Tasks Being Worked by the Pol/Mil Planner



The highest number of tasks the Pol/Mil Planner was working on "simultaneously" was nine and, at times, the number decreased to zero. No analysis was done with these plots.

Analysis of individual work can be done using either the Assignments Log, which shows details of the work being done by each individual including the start and stop times for each task, or the Team Member Metrics log. The following Assignments Log tables show processes 1.1 and 1.2 task assignments and some of the 3.1.1.1 assignments. The number of people assigned to the Command tasks is small while a large number of individuals are assigned to the Effect Based Planning tasks (only few of them are shown in this table).

Table 24. Team Member Assignments for the Simulation Run

ASSIGNMENTS LOG

Task	Task Record	Sub-Proc Rec	Process Rec	Team Member Assigned	Batch ID	Start Time	End Time	Process Time
1.1.1.1	1	1	1	Director SJFHQ	1	8/23/04 0:01	8/23/04 7:00	6.98
1.1.1.1	1	1	1	Chief of Staff	1	8/23/04 0:01	8/23/04 7:00	6.98
1.1.1.1	1	1	1	Deputy Chief of Staff	1	8/23/04 0:01	8/23/04 7:00	6.98
1.1.1.1	1	1	1	Administrative/Support Coordinator #1	1	8/23/04 0:01	8/23/04 7:00	6.98
1.2.1.1	2	2	2	Director SJFHQ	1	8/23/04 0:01	8/23/04 7:00	6.98
1.2.1.1	2	2	2	Chief of Staff	1	8/23/04 0:01	8/23/04 7:00	6.98
1.2.1.1	2	2	2	Deputy Chief of Staff	1	8/23/04 0:01	8/23/04 7:00	6.98
1.2.1.1	2	2	2	Administrative/Support Coordinator #1	1	8/23/04 0:01	8/23/04 7:00	6.98
3.1.1.1	92	23	11	Plans Chief	1	8/23/04 7:00	8/23/04 14:30	7.50
3.1.1.1	92	23	11	Deployment Plans Officer	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	Operational Law Planner	1	8/23/04 7:00	8/23/04 13:30	6.50
3.1.1.1	92	23	11	Planner (Aerospace)	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	Planner (Army)	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	Planner (USMC)	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	Planner (Maritime)	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	Planner (Space-STO)	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	SOF Planner	1	8/23/04 7:00	8/23/04 12:00	5.00
3.1.1.1	92	23	11	Political/Military Planner	1	8/23/04 7:00	8/23/04 14:45	7.75
3.1.1.1	92	23	11	Blue/Red Planner #1	1	8/23/04 7:00	8/23/04 12:15	5.25

The simulation runs until a predetermined amount of simulation time has elapsed. After the last of the SJFHQ processes are completed, the simulation will continue to execute planned meetings until the predetermined time is completed, which adds some tasks and time to the Team Member Metrics table. This can be corrected simply by changing the simulation completion time to when the last task is completed.

The following team member assignments table has been produced from the Assignments log by subtracting out the non-shift time and the extra time and tasks due to running the simulation to completion. The table includes the number of tasks assigned to each individual, hours worked, and the percent of shift time spent working on tasks. The percent is referenced to the 260 hours of available shift time.

Table 25. Work Statistics for SJFHQ Personnel from Simulation Run.

	Task Assignments by Individual	# Tasks	Hrs Worked	% Time
1	Director SJFHQ	55	36	14%
2	Chief of Staff	53	37	14%
3	Deputy Chief of Staff	53	36	14%
4	Administrative/Support Coordinator #1	36	31	12%
5	Administrative/Support Coordinator #2			
6	Plans Chief	120	101	39%
7	Deployment Plans Officer	112	93	36%
8	Operational Law Planner	150	174	67%
9	Planner (Aerospace)	130	143	55%
10	Planner (Army)	153	143	55%
11	Planner (USMC)	144	134	52%
12	Planner (Maritime)	186	204	78%
13	Planner (Space-STO)	150	116	45%
14	SOF Planner	130	136	52%
15	Political/Military Planner	246	244	94%
16	Blue/Red Planner #1	163	137	53%
17	Blue/Red Planner #2	122	101	39%
18	Force Protection Planner (TBE/WME)	137	125	48%
19	Operations Chief	88	86	33%
20	Aerospace Operations Officer #1	66	76	29%
21	Aerospace Operations Officer #2	14	13	5%
22	Land Operations Officer #1	70	76	29%
23	Land Operations Officer #2	14	5	2%
24	SOF Operations Officer #1	70	76	29%
25	SOF Operations Officer #2	13	13	5%
26	Maritime Operations Officer #1	70	76	29%
27	Maritime Operations Officer #2	14	13	5%
28	Fires/Targeting Officer	158	156	60%
29	Logistics Operations Chief	122	100	38%
30	Transportation Operations Officer	130	123	47%
31	Logistics Coordinator	124	102	39%
32	Strategic Mobility Plans Officer	115	96	37%
33	Sustainment Plans Officer	139	124	48%
34	Personnel Plans Officer	93	92	35%
35	Information Superiority Chief	69	52	20%
36	Information Superiority Operations Officer	27	13	5%
37	Intelligence Supervisor	32	14	5%
38	Intelligence Planner	135	155	59%
39	ISR Collection Planner	159	166	64%
40	Current Intelligence Integrator	22	15	6%
41	ISR Operations Officer	71	76	29%
42	ISR Collection Manager	15	8	3%

43	Information Operations Supervisor	160	129	50%
44	Information Operations Planner	169	113	43%
45	Information Operations Officer	27	15	6%
46	PSYOP Specialist	105	55	21%
47	Electronic Warfare Specialist	104	71	27%
48	Computer Network Operations Specialist	116	94	36%
49	ONA Supervisor	23	24	9%
50	ONA Network Analyst	57	79	30%
51	ONA Effects Planner	147	145	56%
52	SoSA Analyst (Political)	75	55	21%
53	SoSA Analyst (Military)	92	60	23%
54	SoSA Analyst (Economic)	87	53	21%
55	SoSA Analyst (Social)	88	53	21%
56	SoSA Analyst (Information)	88	53	21%
57	SoSA Analyst (Infrastructure)	87	53	21%
58	Effects Assessment Supervisor	188	155	60%
59	Effects Assessment Planner	149	129	49%
60	Knowledge Mgt Chief	80	54	21%
61	Network Mgt Specialist	33	15	6%
62	Knowledge Mgt Officer (Plans)	122	103	40%
63	Knowledge Mgt Officer (Ops)	19	6	2%
64	Knowledge Mgt Officer (Info Superiority)	42	29	11%
65	Joint Network Control Officer	32	13	5%
	Total Available Hours = 260	Ave =	81	31%

7.2 Results

Examination Table 25 reveals large variations in the amounts of work being done by SJFHQ personnel. There are two reasons for this:

1. The actual structure of SJFHQ manning and task assignments.
2. Incorrect model assignment of individuals to tasks.

A clear example of the latter is Administrative/Support Coordinator #2. The administrative support tasks should have been divided between Coordinators #1 and #2. By oversight, only #1 was assigned tasks. This is a model deficiency. Additionally, although the first iteration of the model indicates it, the SJFHQ Maritime Planner is not utilized more than other SJFHQ planners during real operations. By oversight he was likely overly assigned tasks that any of the SJFHQ planners could accomplish and would be assigned. Furthermore, there definitely are additional tasks for each SJFHQ Planner that will likely be uncovered through observation and interviews of actual SJFHQ activities, but because a former SJFHQ Maritime Planner was the SME for this model development, his task list likely has more details than other planners.

For reason number 1, the Pol/Mil Planner is an interesting example. That person is occupied 94% of the time, far more than most other individuals. It is interesting to note that discussions with the SME have indicated that consideration has been given to adding another Pol/Mil Planner because they are involved in so many of the meetings and processes. The simulation results support this need.

The results clearly show that there are inefficient variations in personnel utilization. Probably all of these underutilized personnel will see significant increases in utilization as Operations, Information Superiority, Knowledge Management and Command Group Processes are more fully implemented in the model. Possible solutions to real workload inequities are:

Cross-training so that individuals can do a broader range of tasks.
Modification of personnel types assigned.

At this point in simulation development, the results produced must be viewed as approximate. Assignments of individuals to tasks have been done in accord with the SME's experience. Because use of SJFHQ is evolving, these assignments are not necessarily correct for another specific utilization. Also, some of the assignments were outside the SME's areas of experience and were done using the task types and expertise the position title assumes. Actual field observation of assignments to tasks is needed, or discussion with a range of SJFHQ personnel who have been involved in these tasks.

There is one area where we are fairly certain that task assignments and simulation performance need to be adjusted in consonance. Some tasks are worked by large numbers of individuals. This is the case when there are many analyses that to produce a product. Good examples are the many components of SOSA analysis, or of producing the Transition Plan. We have defined the task level such that large groups are involved rather than breaking the tasks further, such as individual service portions of planning. Breaking down to another level would reduce the size of task workgroups and the amount of multi-tasking. An alternate method for enhancing realism would be to change the work rules for how products are produced to adjust them so that individuals did not have to work the full assigned duration of the task. Again, exactly how this adjustment should be made should follow observing SJFHQ operations in the field.

Appendix-1. SJFHQ Processes and Personnel Task Assignments Table

SJFHQ Processes and Personnel Task Assignments

1st	2nd	3rd Lvl	Processes and Sub-Processes	Work-Unit Personnel	Inputs From	Duration	Delay	Priority
Command Group Directions								
1.1 Assess National Guidance								
		1.1.1.1	Dummy	1, 2, 3, 4	SECDEF	1		10
1.2 Assess AOR Plans								
		1.2.1.1	Dummy	1, 2, 3, 4	RCC	0.5		10
1.3 Develop Initial Guidance								
	1.3.1		Assess Transition and Provide Guidance					
		1.3.1.1	Dummy	1, 2	SECDEF, 3.1.1.10	0.2		1
	1.3.2		Commander's Intent Development					
		1.3.2.1	Develop Commander's Intent	1, 2, 3, 4, 6, 19, 29, 60	1.3.1.1, 1.1.1.1, 1.2.1.1	0.4		5
		1.3.2.2	Transmit Cdr's Intent for Mission Analysis	3	1.3.2.1	0.2		1
1.4 Develop Commander's Planning Guidance								
	1.4.1		Assess Mission Analysis					
		1.4.1.1	Make Adjustments and Approve	1, 2, 3	3.2.20.6	0.2		1
		1.4.1.2	Modify Guidance and Intent	1, 2, 3	1.4.1.1	0.2		1
	1.4.2		Planning Guidance Development					
		1.4.2.1	Develop Planning Guidance	1, 2, 3	1.4.1.2, 3.2.21.4	0.5		5
		1.4.2.2	Submit Plans to HHQ for Approval	1	1.4.2.1	0.5		1
		1.4.2.3	Review HHQ Directives and Rework Guidance	1, 2, 3	HHQ	0.2		1
		1.4.2.4	Xmit Cdr's Plan Guidance to COA Develop	3	1.4.2.3	0.4		1
1.5 Develop Commander's Operational Guidance								
		1.5.1.1	Assess COAs	1, 2, 3	3.3.10.8	0.1		1
		1.5.1.2	Chose 1 or 2 COAs for Detailed Analysis	1	1.5.1.1	0.1		1
		1.5.1.3	Xmit COAs for Anal, Comparison & Selection	3	1.5.1.2	0.2		1
1.6 Choose COA and Refined Guidance								
		1.6.1.1	Decide on COA	1	3.4.4.1	0.2		1
		1.6.1.2	Submit COAs to HHQ for Approval	1, 6, 10, 35	1.6.1.1	0.8		1
		1.6.1.3	Review HHQ Directives, Rework COAs Choice	1, 3, 6, 9, 10, 11, 12, 13, 14, 15	HHQ	0.2		1
		1.6.1.4	Refine COA Guidance	1, 2	1.6.1.3	0.5		5
		1.6.1.5	Review Wargame and Refinement Results	1, 2	3.5.1.10, 3.4.4.4	0.4		1
ONA								
2.1 Determine ONA Level of Effort								
		2.1.1.1	Assess Intel, Cdrs' Guidance, Geospatial Info	35, 36, 37, 42, 43, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 64	1.3.2.2, ONA	4		10
		2.1.1.2	Compare Situation & Intel with ONA Baseline	50, 51, 52, 53, 54, 55, 56, 57	2.1.1.1, ONA	8		10
		2.1.1.3	Identify changes in Environment	50, 51, 52, 53, 54, 55, 56, 57	2.1.1.2	4		10

2.1.1.4	Produce RFIs	50, 51, 52, 53, 54, 55, 56, 57	2.1.1.3	1		10
2.1.1.5	Produce SME Request	50, 51, 52, 53, 54, 55, 56, 57	2.1.1.3	1		10
2.1.1.6	Brief Supervisor	39, 49, 64, 50, 51, 52, 53, 54, 55, 56, 57	2.1.1.3, 2.1.1.4, 2.1.1.5	0.5		5
2.1.1.7	Brief Chief of Staff	2, 3, 35, 49, 64	2.1.1.6	0.5		5
2.1.1.8	Review RFI and SME Information	50, 51, 52, 53, 54, 55, 56, 57	2.1.1.4, 2.1.1.5, 4.3.1.3	0.5		10
2.2 Situation Analysis						
2.2.1 Individual SOSA Analysis						
2.2.1.1	ID Essential Elements	52, 53, 54, 55, 56, 57	2.1.1.3, 2.1.1.7	0.2		10
2.2.1.2	ID Subcomponents	52, 53, 54, 55, 56, 57	2.2.1.1	0.2		10
2.2.1.3	ID Strengths & Weaknesses	52, 53, 54, 55, 56, 57	2.2.1.2	0.2		10
2.2.1.4	Vulnerability ID	52, 53, 54, 55, 56, 57	2.2.1.3	2		10
2.2.1.5	ID Vulnerability Exploitation Opportunity	52, 53, 54, 55, 56, 57	2.2.1.4	2		10
2.2.1.6	ID Nodes and Potential Key Nodes	52, 53, 54, 55, 56, 57	2.2.1.5	2		10
2.2.1.7	Review, Recommend Updating PMESII Nodes	52, 53, 54, 55, 56, 57	2.2.1.6	1		10
2.2.1.8	Update written Blue View of Red EXSUMs	52, 53, 54, 55, 56, 57	2.2.1.7	1		10
2.2.1.9	Update written Red Vulnerability Document	52, 53, 54, 55, 56, 57	2.2.1.7	1		10
2.2.2 Blue/Red Analysis						
2.2.2.1	Convene BRC	15, 16, 17, 38, 44, 53, 59	2.2.1.7	0		5
2.2.2.2	Review existing BR summaries	15, 16, 17, 38, 44, 53, 59	2.2.2.1	0.5		5
2.2.2.3	Compare with Current Blue Views	15, 16, 17, 38, 44, 53, 59	2.2.2.2	0.5		5
2.2.2.4	Compare with Current Red Views	15, 16, 17, 38, 44, 53, 59	2.2.2.2	0.5		5
2.2.2.5	Update Blue/Red Summaries	16	2.2.2.3, 2.2.2.4	1		8
2.2.2.6	Review, post Summaries	50	2.2.2.5	0.5		8
2.2.3 Rest of World (ROW) Analysis						
2.2.3.1	Convene ROW, PolMil, or Grey WG	15, 38, 52	2.2.1.7	0		5
2.2.3.2	Review existing ROW summaries	15, 38, 52	2.2.3.1, ONA	0.5		5
2.2.3.3	Compare w Current and Projected ROW Objective	15, 38, 52	2.2.3.2	0.5		5
2.2.3.4	Update ROW Summaries	15, 38, 52	2.2.3.3	1		8
2.2.3.5	Review, Post Summaries	50	2.2.3.4	0.5		8
2.2.4 Update ONA Decision Support Products and Current EXSUM						
2.2.4.1	Review EXSUM and Vulnerability Updates	49	2.2.1.8, 2.2.1.9	0.5		10
2.2.4.2	Approve EXSUM and Vulnerability for ONA	49	2.2.4.1	0.5		10
2.2.4.3	Review Blue Obj and Effect from Plans Chief	49	3.1.1.11	0.5		10
2.2.4.4	Review Blue Objectives Analysis	49	2.2.2.5, 2.2.3.5	0.5		10
2.2.4.5	Post Blue Obj and Effects update to ONA	64	2.2.4.3, 2.2.4.4	0.5		10
2.2.4.6	Review Red objectives Analysis	49	2.2.2.5	0.5		10
2.2.4.7	Post Red Obj. from Blue Perspective to ONA	16	2.2.4.6	0.5		10
2.2.4.8	Review Current Effects Analysis	49 ** DON'T USE **	2.4.7.5, ONA	0.5		10

	2.2.4.9	Post Current Eff Assessment update to ONA	64	2.2.4.7	0.5	10
2.3 Update ONA for Changes to PMESII Systems						
2.3.1	Effects-Node Link Analysis					
	2.3.1.1	Convene ONA Work Group	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 23, 25, 27, 28, 29, 30, 33, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 64	2.2.4.7	0	5
	2.3.1.2	Brief recommended Changes (Nodes)	"	2.1.1.8, 2.3.1.1	0.5	8
	2.3.1.3	Validate Node Change Recommendation	"	2.3.1.2	0.3	8
	2.3.1.4	Integrated Analysis Among Systems	"	2.3.1.3	0.3	8
	2.3.1.5	Recommend Effect-to-Node Links	"	2.3.1.4	0.3	8
	2.3.1.6	Validate E-N Link Change Recommendation	"	2.3.1.5	0.2	8
	2.3.1.7	Rcmd Actions for Each Eff-Node Link Change	"	2.3.1.6	0.3	8
	2.3.1.8	Validate Each E-N-A Link	"	2.3.1.7	0.2	8
2.3.2	Secondary, Unintended/Undesired Effects Analysis		"			8
	2.3.2.1	ID Secondary, Unintended/Undesired Effects	"	2.3.1.8	0.3	8
	2.3.2.2	Validate Secondary and Unintended Effects	"	2.3.2.1	0.2	8
2.3.3	Effects-Resources Analysis		"			8
	2.3.3.1	Recommend Resources for Each E-N-A Link	"	2.3.2.2	0.2	8
	2.3.3.2	Validate Each E-N-A-R Link	"	2.3.3.1	0.2	8
	2.3.3.3	Publish E-N-A-R, Secondary & Unintended Effts	50, 51, 64	2.3.3.2	0.6	10
2.4 Effects Development and Assessment Analysis						
2.4.1	Effects Measures Development					
	2.4.1.1	Examine ONA DB for Nominated Effects	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 31, 32, 33, 34, 38, 62	2.3.3.3	0.3	8
	2.4.1.2	Convene Effects Work Group	58, 59, 39, 38, 15, 33, 13, 44, 16, 17, 51, 28, 52, 53, 54, 55, 56, 57	2.4.1.1	0	8
	2.4.1.3	Validate Nominated Effects	"	2.4.1.2	0.8	8
	2.4.1.4	Enter New Effect into ONA	"	2.4.1.3	0.2	8
	2.4.1.5	Develop Candidate MOE	"	2.4.1.4	0.4	8
2.4.2	Effects-Node-Actions Link Analysis					8
	2.4.2.1	Nominate Nodes to Achieve the Eff (E-N Link)	"	2.4.1.5	0.5	8
	2.4.2.2	Validate E-N Link Recommendation	"	2.4.2.1	0.2	8
	2.4.2.3	Integrated Analysis Among Systems	"	2.4.2.2	0.3	8
	2.4.2.4	Nominate Actions to Each E-N Link	"	2.4.2.3	0.3	8
	2.4.2.5	Validate Each E-N-A Link	"	2.4.2.4	0.2	8
2.4.3	Secondary, Unintended/Undesired Effects Analysis					8
	2.4.3.1	ID Secondary, Unintended/Undesired Effects	"	2.4.2.5	0.3	8
	2.4.3.2	Validate Secondary and Unintended Effects	"	2.4.3.1	0.2	8
	2.4.3.3	Develop Candidate Secondary MOEs	"	2.4.3.2	0.3	8
2.4.4	Effects-Resources Analysis					8
	2.4.4.1	Recommend Resources for Each E-N-A Link	"	2.4.3.3	0.2	8
	2.4.4.2	Validate Each E-N-A-R Link	"	2.4.4.1	0.2	8

	2.4.4.3	Publish E-N-A-R, Secondary & Unintended Effts	39, 64	2.4.4.2	0.2		10
2.4.5	Develop Effects Assessment input to Collection Plan						
	2.4.5.1	Dev specific indicators each Candidate MOE	39, 58, 59, 37, 38, 42, 51	2.4.4.3	0.5		8
	2.4.5.2	Dev Assessment Criteria each MOE indicator	"	2.4.5.1	0.3		8
	2.4.5.3	Dev reporting periodicity each MOE indicator	"	2.4.5.2	0.2		8
	2.4.5.4	Determine ISR Collection Requirements	"	2.4.5.3	0.3		8
	2.4.5.5	Pass to J2 for Collection Plan	64, 39	2.4.5.4	0.1		10
2.4.6	Develop Assessment Methodology						
	2.4.6.1	Examine Effects and MOEs	39, 58, 59, 37, 38, 42, 51	2.4.5.4	0.2		8
	2.4.6.2	Determine ISR Data MOE Linkages	"	2.4.6.1	0.4		8
	2.4.6.3	Develop MOE Assessment methods	"	2.4.6.2	0.4		8
2.4.7	Update the ONA during EBO		**** DON'T USE IN THIS VERSION OF THE SIMULATION ****				
	2.4.7.1	Assess ISR Reports	58, 59, 38, 39, 13, 15, 16, 28, 44, 51	3.7.1.7, CIE	0.2		
	2.4.7.2	Evaluate MOEs	58, 59, 38, 39, 13, 15, 16, 28, 44, 51	2.4.6.3, 2.4.7.1	0.3		
	2.4.7.3	Integrate Effects Assessment	58, 59, 39, 38, 16	2.4.7.2	0.4		
	2.4.7.4	ID Changes to PMESII Systems	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 23, 25, 27, 28, 29, 30, 33, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 64	2.4.7.3	0.3		
	2.4.7.5	Report Assessment to EBP	58, 59	2.4.7.4	0.2		
Effects Based Planning							
3.1 Develop Transition to Crisis Strategy							
3.1.1	Develop Situational Awareness						
	3.1.1.1	Review Orders, Plans & Intel Summaries	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 31, 32, 33, 34, 38, 39, 44, 51, 59, 62	1.1.1.1, HHQ, ONA	5		10
	3.1.1.2	Time Analysis	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 31, 32, 33, 34, 38, 39, 44, 51, 59, 62	3.1.1.1	1		10
	3.1.1.3	Define Battlespace Environment	"	3.1.1.1	0.5		10
	3.1.1.4	Situation Assessment	"	3.1.1.1	0.5		10
	3.1.1.5	Validation of Current Plans, Orders	"	3.1.1.1	1		8
	3.1.1.6	Key Node Impact Evaluation	"	3.1.1.1	1		5
	3.1.1.7	Receive Intel, JIPB, ONA Summaries	"	3.1.1.1	1		5
	3.1.1.8	Receive Current Situation Briefing	"	3.1.1.1	0.7		5
	3.1.1.9	Prepare and Pre-brief Transition Briefing	6, 10, 62, 18, 15, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 31, 32, 33, 34, 38, 39, 44, 46, 47, 48, 51, 59	3.1.1.2, 3.1.1.3, 3.1.1.4, 3.1.1.5, 3.1.1.6	1		8
	3.1.1.9a	Prepare and Pre-brief Transition Briefing	"	3.1.1.7, 3.1.1.8	0		8
	3.1.1.10	Brief Formal Transition Briefing	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65	3.1.1.9, 3.1.1.9a	2		1
	3.1.1.11	Post briefing and notes	62, 18	3.1.1.10	0.2		10
3.2 Mission Analysis							
3.2.1	Organize for JPG						

	3.2.1.1	Develop detailed planning timeline	6	1.3.2.2	0.5	8
	3.2.1.2	Develop personal responsibilities to BCC & WGs	6	3.2.1.1	0.3	8
	3.2.1.3	Assemble and Post Products	7, 10, 11, 12, 18, 34	3.2.1.2	0.2	10
3.2.3	Determine Facts and Assumptions					
	3.2.3.1	Convene F&A Work Group	11, 18, 15, 32, 39	3.2.1.3	0	10
	3.2.3.2	Refine Battlespace Environment	11, 18, 15, 32, 39	3.2.3.1	0.3	5
	3.2.3.3	Force Availability, Readiness	11, 18, 15, 32, 39	3.2.3.1	0.2	5
	3.2.3.4	Lift Priority & Allocation	11, 18, 15, 32, 39	3.2.3.1	0.2	5
	3.2.3.5	Multinational Force Avail	11, 18, 15, 32, 39	3.2.3.1	0.3	5
	3.2.3.6	Pol/Mil Situation	11, 18, 15, 32, 39	3.2.3.1	0.2	5
	3.2.3.7	IAC Operations & Actions	11, 18, 15, 32, 39	3.2.3.1	0.4	5
	3.2.3.8	ID IAC Roles	11, 18, 15, 32, 39	3.2.3.1	0.4	5
	3.2.3.9	Host Nation Support Avail	11, 18, 15, 32, 39	3.2.3.1	0.3	5
	3.2.3.10	Red Concept of Friendlies	11, 18, 15, 32, 39	3.2.3.1	0.4	5
	3.2.3.11	Correlate Facts and Assumptions	11, 18, 15, 32, 39	3.2.3.2, 3.2.3.3, 3.2.3.4, 3.2.3.5, 3.2.3.6	0.7	8
	3.2.3.11a	Correlate Facts and Assumptions	11, 18, 15, 32, 39	3.2.3.7, 3.2.3.8, 3.2.3.9, 3.2.3.10	0	8
	3.2.3.12	Consolidate Assumptions	11, 18, 15, 32, 39	3.2.3.11, 3.2.5.6, 3.2.4.4	0.4	8
	3.2.3.13	Post Facts and Assumptions for Review & Brief	11, 18	3.2.3.12, 3.2.3.12a	0.2	10
3.2.4	Determine Limitations					
	3.2.4.1	Convene Limitations Work Group	7, 34, 8, 13, 31, 44	3.2.1.3	0	10
	3.2.4.2	Identify Mission Constraints	7, 34, 8, 13, 31, 44	3.2.4.1	1	5
	3.2.4.3	Identify Mission Restraints	7, 34, 8, 13, 31, 44	3.2.4.1	1	5
	3.2.4.4	ID Assumptions, pass to Facts/Assumptions WG	7, 34, 8, 13, 31, 44	3.2.4.1	0.8	5
	3.2.4.5	Post Limitations for Review & Briefing	7, 34	3.2.4.2, 3.2.4.3	0.2	10
3.2.5	ID Tasks					
	3.2.5.1	Convene Tasks Work Group	12, 10, 14, 9, 33, 38	3.2.1.3	0	10
	3.2.5.2	Identify Specified Tasks	12, 10, 14, 9, 33, 38	3.2.5.1	0.8	5
	3.2.5.3	Develop Implied Tasks	12, 10, 14, 9, 33, 38	3.2.5.1	1.2	5
	3.2.5.4	Recommend Essential Tasks	12, 10, 14, 9, 33, 38	3.2.5.1	0.8	5
	3.2.5.5	Draft Revised Mission Statement	12, 10, 14, 9, 33, 38	3.2.5.1	1	5
	3.2.5.6	ID Assumptions, pass to Facts/Assumptions WG	12, 10, 14, 9, 33, 38	3.2.5.1	0.5	5
	3.2.5.7	Post Tasks for Review & Briefing	12, 10	3.2.5.2, 3.2.5.3, 3.2.5.4, 3.2.5.5	0.2	10
3.2.6	JPG Review Fact/Assumptions, Limitations & Task Products					
	3.2.6.1	Vet Work Group Products	11, 18, 7, 34, 12, 10	3.2.3.13, 3.2.4.5, 3.2.5.7	1.5	8
	3.2.6.2	Prepare applicable section of Miss Anal Brief	11, 18, 7, 34, 12, 10	3.2.6.1	0.5	10
	3.2.6.3	Post Draft products for MA Briefing	11, 18, 7, 34, 12, 10	3.2.6.2	0.2	10
3.2.7	Initial Risk Assessment					
	3.2.7.1	Review Stated Acceptable Risk	11, 18, 15, 32, 39	1.3.1.1, 3.2.6.2	0.2	5
	3.2.7.2	Identify Force Protection Requirements	11, 18, 15, 32, 39	3.2.7.1	0.4	5

	3.2.7.3	Identify Mission Associated Risk	11, 18, 15, 32, 39	3.2.7.2	0.3	5
	3.2.7.4	Identify Methods for Risk Mitigation	11, 18, 15, 32, 39	3.2.7.3	0.4	5
	3.2.7.5	Identify EEFI	11, 18, 15, 32, 39	3.2.7.4	0.3	8
	3.2.7.6	Develop Unintended/undesired Effects	11, 18, 15, 32, 39	3.2.7.5, 2.4.3.2	0.4	5
	3.2.7.7	Recommend Revised Acceptable Risk	11, 18, 15, 32, 39	3.2.7.6	0.3	5
	3.2.7.8	Post Risk Assessment for Review	18	3.2.7.7	0.2	10
3.2.8	Determine End State Objectives					
	3.2.8.1	Recommend End State/Objectives	12, 10, 14, 9, 33, 38	3.2.6.2	0.5	5
	3.2.8.2	Recommend, Refine Desired Effects	12, 10, 14, 9, 33, 38	3.2.8.1, 2.2.4.3	0.5	5
	3.2.8.3	Develop Recommended PEL	12, 10, 14, 9, 33, 38	3.2.8.2, 2.4.4.3	0.3	5
	3.2.8.4	Draft propose Supprtng/ Supprtd relations for effts	12, 10, 14, 9, 33, 38	3.2.8.3	0.4	8
	3.2.8.5	Refine Restated Mission	12, 10, 14, 9, 33, 38	3.2.8.4	0.5	5
	3.2.8.6	Draft Proposed Cdr's Intent	12, 10, 14, 9, 33, 38	3.2.8.5	0.5	5
	3.2.8.7	Post End States, Objectives and PEL for review	10	3.2.8.6	0.2	10
3.2.9	Force Structure Analysis and SME Shortfalls					
	3.2.9.1	Review Forces for Planning and Locations	7, 34, 8, 13, 31, 44	3.2.6.2	0.2	8
	3.2.9.2	Review Threat Capability	7, 34, 8, 13, 31, 44	3.2.9.1	0.2	8
	3.2.9.3	Review Tasks	7, 34, 8, 13, 31, 44	3.2.9.2	0.2	8
	3.2.9.4	Determine Force Structure Capability Required	7, 34, 8, 13, 31, 44	3.2.9.3	0.4	8
	3.2.9.5	ID Shortfalls	7, 34, 8, 13, 31, 44	3.2.9.4	0.2	8
	3.2.9.6	Dev J Force Capability Register	7, 34, 8, 13, 31, 44	3.2.9.5	0.5	5
	3.2.9.7	Post Shortfall for review	7, 34, 8, 13, 31, 44	3.2.9.6	0.2	10
3.2.10	Analyze Strengths and Vulnerabilities					
	3.2.10.1	Review Enemy Str/Vul/COG (see ONA Today)	16, 9, 10, 11, 12, 13, 14, 31	2.2.1.8, 2.2.1.9	0.3	8
	3.2.10.2	Refine Potential Enemy Str/Vul	16, 9, 10, 11, 12, 13, 14, 31	3.2.10.1	0.4	5
	3.2.10.3	Identify Potential Decisive Points	16, 9, 10, 11, 12, 13, 14, 31	3.2.10.2	0.5	5
	3.2.10.4	Review Friendly Overall DIME Str/Vul & COG	16, 9, 10, 11, 12, 13, 14, 31	3.2.10.3	0.3	8
	3.2.10.5	Refine Friendly Str/Vul & COG	16, 9, 10, 11, 12, 13, 14, 31	3.2.10.4	0.4	8
	3.2.10.6	Post Strength and Vulnerability Anal for review	16, 9	3.2.10.5	0.2	10
3.2.11	Develop Initial CCIRs, PIRs & FFIR					
	3.2.11.1	Review Current CCIR (including relevant plans)	38, 39, 17, 18, 33, 44, 59	3.2.8.6	0.2	10
	3.2.11.2	Review Assumptions	38, 39, 17, 18, 33, 44, 59	3.2.11.1	0.3	8
	3.2.11.3	Develop Recommended CCIRs, PIRs & FFIRs	38, 39, 17, 18, 33, 44, 59	3.2.11.2	0.6	5
	3.2.11.4	Post CCIRs, PIRs & FFIRs for review	38, 39	3.2.11.3	0.2	10
3.2.12	Develop Initial C2 Diagram					
	3.2.12.1	Review Current C2 Architecture	12	1.3.2.2	0.2	8
	3.2.12.2	Review Forces Avail for Planning and Task	12	3.2.12.1	0.2	8
	3.2.12.3	Develop Proposed C2 Architecture	12	3.2.12.2	0.8	8
	3.2.12.4	Vet through Core Planners	9, 10, 11, 12, 13, 14	3.2.12.3	0.3	5

	3.2.12.5	Refine Proposed C2 Architecture	12	3.2.12.4	0.6		8
	3.2.12.6	Vet through Component Planners	12	3.2.12.5	0.6		5
	3.2.12.7	Refine Proposed C2 Architecture	12	3.2.12.6	0.5		8
	3.2.12.8	Vet through Plans Chief	6, 12	3.2.12.7	0.4		5
	3.2.12.9	Refine Proposed C2 Architecture	12	3.2.12.8	0.5		8
	3.2.12.10	Post C2 Architecture for review	12	3.2.12.9	0.2		10
3.2.13	Logistics and Force Flow assessment and draft guidance						
	3.2.13.1	Request Logistics Plan	7, 29, 30, 31, 32, 33, 34	3.2.6.2	0.2		10
	3.2.13.2	Assess Logistics Plan	7, 29, 30, 31, 32, 33, 34	6.2.1.7	0.3		10
3.2.14	Draft Recommend Battlespace Geometry						
	3.2.14.1	Access Geospatial reference material	12, 62	1.3.2.2	0.2		10
	3.2.14.2	Develop options	12	3.2.14.1	0.8		8
	3.2.14.3	Vet through Core Planners	12, 9, 10, 11, 13, 14	3.2.14.2	0.6		5
	3.2.14.4	Refine proposed Battlespace Geometry	12	3.2.14.3	0.6		8
	3.2.14.5	Vet through Plans Chief	12, 6	3.2.14.4	0.5		5
	3.2.14.6	Refine proposed Battlespace Geometry	12	3.2.14.5	0.4		8
	3.2.14.7	Post to MA decision Briefing	12, 62	3.2.14.6	0.2		10
3.2.15	Draft sequence of Eff and Objectives on Operational Timeline						
	3.2.15.1	Convene work group	7	2.4.4.3	0		10
	3.2.15.2	Review all MA products	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 31, 32, 33, 34, 38, 39, 44, 51	3.2.15.1, 3.2.6.3, 3.2.7.8, 3.2.8.7, 3.2.9.7	0.3		8
	3.2.15.2a	Review all MA products	"	3.2.10.6, 3.2.11.4, 3.2.12.10, 3.2.14.7	0		
	3.2.15.3	Develop proposed Operational Timeline	"	3.2.15.2, 3.2.15.2a	0.8		5
	3.2.15.4	Vet through Plans Chief	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 31, 32, 33, 34, 38, 39, 44, 51	3.2.15.3	0.7		5
	3.2.15.5	Refine proposed Operational timeline	10	3.2.15.4	0.6		8
	3.2.15.6	Post to MA Decision Briefing	10, 16	3.2.15.5	0.2		10
3.2.16	Requested FDOs and DIME support Review						
	3.2.16.1	Review list of potential FDO	18, 15, 7, 8, 9, 10, 11, 12, 13, 14, 44, 51, 52, 53, 54, 55, 56, 57, 58, 59	1.3.2.2, HHQ	0.3		8
	3.2.16.2	FDO support to achieve potential desired effects	"	3.2.16.1	0.4		8
	3.2.16.3	FDO direct support for early task accomplishment	"	3.2.16.2	0.4		8
	3.2.16.4	Conduct risk analysis for undesired effects	"	3.2.16.3	0.5		8
3.2.17	Request ROE modifications						
	3.2.17.1	Request Modifications	8	3.2.15.4			10
	3.2.17.2	Assess Modifications	8	7.1.1.2	0.4	4	10
3.2.18	Draft Info Ops and deception Guidance						
	3.2.18.1	Request Info Ops Plan	43, 44, 45, 46, 47, 48	3.2.6.2			10
	3.2.18.2	Assess Info Ops Plan	43, 44, 45, 46, 47, 48	7.2.1.3	0.4	4	10
3.2.19	Draft Recommended Spec Tech Ops Guidance						

3.2.19.1	Compare STO capabilities to Enemy Strgth/vuln	13	2.2.1.9, 2.2.1.8	0.5		10
3.2.19.2	Develop proposed STO Guidance	13	3.2.19.1	0.4		10
3.2.19.3	Vet through Core Planners	13, 8, 9, 10, 11, 12, 13, 14	3.2.19.2	0.3		5
3.2.19.4	Refine proposed STO Guidance	13	3.2.19.3	0.2		10
3.2.19.5	Vet through Plans Chief	13, 6	3.2.19.4	0.3		5
3.2.19.6	Refine proposed STO Guidance	13	3.2.19.5	0.2		10
3.2.19.7	Post in STO Channels for Cdr's Review	13	3.2.19.6	0.2		10
3.2.20	Mission Analysis Briefing					
3.2.20.1	Assemble MA Briefing	10, 18, 62	3.2.15.6, 3.2.16.4, 3.2.19.7, 3.2.13.2	0.5		5
3.2.20.1a	Assemble MA Briefing	10, 18, 62	3.2.17.2, 3.2.18.2	0		
3.2.20.2	Vet All Elements	10, 18, 62, 6, 7, 8, 9 , 11, 12, 13, 14, 15, 16, 17, 28, 31, 32, 33, 34, 38, 39, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 64	3.2.20.1, 3.2.20.1a	2		8
3.2.20.3	Refine MA Briefing	10, 18, 62, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18	3.2.20.2	0.5		8
3.2.20.4	MA Pre-brief to Deputy Cdr	2, 10, 18, 62, 6, 7, 8, 9 , 11, 12, 13, 14, 15, 16, 17, 28, 31, 32, 33, 34, 38, 39, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 64	3.2.20.3	1.5		8
3.2.20.5	Refine MA Briefing	10, 18, 62	3.2.20.4	0.5		8
3.2.20.6	Formal MA Briefing to Cdr	1, 2, 3, 10, 18, 62, 6, 7, 8, 9 , 11, 12, 13, 14, 15, 16, 17, 28, 31, 32, 33, 34, 38, 39, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 64	3.2.20.5	1		1
3.2.20.7	Incorporate Cdr's mods, guidance, intent	10, 18, 62	1.4.1.2	0.2		8
3.2.20.8	Plans Chief reviews and approves	6, 10	3.2.20.7	0.2		5
3.2.20.9	MA Briefing, notes, materials officially posted	10, 62	3.2.20.8	0.2		10
3.2.21	Prepare Warning Order					
3.2.21.1	Assign paragraph leads and checkers	6, 10	3.2.15.6, 3.2.20.9	0.2		10
3.2.21.2	Convert MA products into warno format	10, 9, 11. 12, 13, 14, 15, 18, 31, 44, 59, 62	3.2.21.1	0.5		8
3.2.21.3	Refine paragraphs based on Cdr's decisions	10, 18, 31, 12	3.2.21.2	0.3		8
3.2.21.4	Pass up chop chain for approval and release	2, 3, 6	3.2.21.3	0.5		5
3.2.21.5	Post all information	10, 62	3.2.21.4	0.2		10
3.3 COA Development						
3.3.1	Prepare for COA Development					
3.3.1.1	Rev Mission Analysis & Cmdr's Guidance	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	1.4.2.4, 3.2.20.9, 3.2.21.5	0.3		8
3.3.1.2	Promulgate COA dev Timeline and responsibilities	6, 10	3.3.1.1	0.3		8
3.3.1.3	Develop draft evaluative Criteria	6	3.3.1.2	0.3		8
3.3.1.4	Convene JPG	6	3.3.1.3	0		10
3.3.2	Broad Concept/Major Tasks/Phases					
3.3.2.1	Determine Operational tasks for set-cond phase	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 62	3.3.1.4	0.2		8
3.3.2.2	Determine Operational tasks for decisive ops phase	"	3.3.2.1	0.2		8

	3.3.2.3	Determine Operational tasks for Transition the Force Phase	"	3.3.2.2	0.2		8
	3.3.2.4	Identify supporting actions for Operational Tasks	"	3.3.2.3	0.8		8
	3.3.2.5	Time/Space Phasing	"	3.3.2.4	0.8		8
	3.3.2.6	Organize tasks per phase into broad COA Concept	"	3.3.2.5	0.8		8
	3.3.2.7	Dvlp Cmnd Relationship Opt Matrix for Op'l tasks	"	3.3.2.6	0.3		8
	3.3.2.8	Rev forces available/capable to achieve tasks	"	3.3.2.7	0.3		8
	3.3.2.9	Dev Forces or sequencing options requests	7, 8, 9, 10, 11, 12, 13, 14, 18, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48	3.3.2.8	0.4		8
3.3.3	Determine Potential Decisive Points						
	3.3.3.1	Map out/visualize Key Nodes	58, 59, 39, 38, 15, 33, 13, 44, 16, 17, 51, 28, 52, 53, 54, 55, 56, 57	3.3.2.9, 2.3.3.3	0.1		8
	3.3.3.2	Identify Key node concentration areas	"	3.3.3.1	0.3		8
	3.3.3.3	Brainstorm options for sequencing actions at decisive points	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44 ,46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.3.3.2	0.6		5
	3.3.3.4	Review Red View of Potential Decisive Points	"	3.3.3.3	0.3		8
3.3.4	Develop Mission statements for Main and Supporting efforts						
	3.3.4.1	ID Main Effort task and purpose by Phase	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 62	3.3.3.4	0.3		8
	3.3.4.2	ID supporting Effort task and purpose by Phase	"	3.3.4.1	0.4		8
	3.3.4.3	Main and Support Efforts support PolMil Obj	"	3.3.4.2	0.3		8
	3.3.4.4	Identify IA resources engaged	"	3.3.4.3	0.3		8
	3.3.4.5	Rev forces available/capable for support tasks	"	3.3.4.4	0.2		8
	3.3.4.6	Develop Request for Forces or sequencing options	"	3.3.4.5	0.2		8
	3.3.4.7	Determine force protection requirements (risk analysis)	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 38, 39, 43, 44, 46, 47, 48, 62	3.3.4.6	0.3		8
	3.3.4.8	Estimate gross strategic lift requirements	7, 29, 30, 31, 32, 33, 34	3.3.4.7	0.2	2	5
3.3.5	Task Organize Components						
	3.3.5.1	Assign tasks to components	8, 9, 10, 11, 12, 13, 14, 15	3.3.4.8	0.3		5
	3.3.5.2	Harmonize support requirements with IAC	8, 9, 10, 11, 12, 13, 14, 15	3.3.5.1	0.4		5
	3.3.5.3	Review Component Tasks	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 62	3.3.5.2	0.2	4	8
	3.3.5.4	Resource Components	"	3.3.5.3	0.3		8
	3.3.5.5	Estimate gross sustainment requirements	7, 29, 30, 31, 32, 33, 34	3.3.5.4	0.4	3	5
3.3.6	Develop Control Measures for COA						
	3.3.6.1	Refine JOA	8, 9, 10, 11, 12, 13, 14, 15	3.3.5.5	0.3		5
	3.3.6.2	Integrate Action	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 62	3.3.6.1	0.5		8
	3.3.6.3	Draft control measures	8, 9, 10, 11, 12, 13, 14, 15	3.3.6.2	0.5		5
3.3.7	Develop Initial Fires Products						
	3.3.7.1	Integrate Fires and Force Protection Guidance	8, 9, 10, 11, 12, 13, 14, 15, 18, 28, 39, 44, 46, 47, 48, 62	3.3.6.3	0.5		8
	3.3.7.2	Develop Targeting Guidance	"	3.3.7.1	0.5		8

	3.3.7.3	Develop Initial Joint Target list	"	3.3.7.2	0.5		8
	3.3.7.4	Initiate No-Strike & Restricted Target Lists	"	3.3.7.3	0.5		8
	3.3.7.5	ID Forces Required by UTC	8, 9, 10, 11, 12, 13, 14, 15	3.3.7.4	0.2	6	5
	3.3.7.6	Draft Flow Anal & Deploy	8, 9, 10, 11, 12, 13, 14, 15	3.3.7.5	0.5	4	5
3.3.8	Develop COA Sketch and CONOPS						
	3.3.8.1	Assemble Map products	10, 11, 12, 62	3.3.7.6	0.1		10
	3.3.8.2	Draft Sketch	9, 10, 11, 12, 13, 14, 18	3.3.8.1	0.6		8
	3.3.8.3	Draft Narrative	9, 10, 11, 12, 13, 14, 18	3.3.8.2	0.5		8
	3.3.8.4	Vet COA Sketch and Narrative	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 62	3.3.8.3	0.5		8
	3.3.8.5	Refine COA Sketch and Narrative	9, 10, 11, 12, 13, 14, 18	3.3.8.4	0.5		8
	3.3.8.6	Post Draft Sketch for Azimuth Check Briefing	10, 62	3.3.8.5	0.2		10
3.3.9	Test Validity of Each COA						
	3.3.9.1	Suitability	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44 ,46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.3.8.6	0.2		5
	3.3.9.2	Feasibility of Assets, Lift, & ISR	"	3.3.9.1	0.3		5
	3.3.9.3	Acceptability of Risk	"	3.3.9.2	0.2		5
	3.3.9.4	Determine Reserve Require	"	3.3.9.3	0.3		5
	3.3.9.5	Transportation Feasibility	"	3.3.9.4	0.2		5
	3.3.9.6	Effect-key node linkage, Secondary Outcomes	"	3.3.9.5	0.5		5
3.3.10	JPG COA Selection						
	3.3.10.1	Cdr's Intent Azimuth Check	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44 ,46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.3.9.6, 1.4.2.4	1		1
	3.3.10.2	Develop Guidance Documents for JOC	10, 11, 12, 62	3.3.10.1	1		5
	3.3.10.3	Conduct Component Horizontal Collaboration	9, 10, 11, 12, 13, 14, 18	3.3.10.2	4	36	10
	3.3.10.4	Refine COA Development Products	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 44, 46, 47, 48, 51, 59, 62	3.3.10.2	6		8
	3.3.10.5	JPG COA Completion Meeting	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 44, 46, 47, 48, 51, 59, 62	3.3.10.4, 3.3.10.3	2		10
	3.3.10.6	Prepare RCC Briefing	10, 18, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 28, 31, 32, 33, 34, 38, 39, 44, 46, 47, 48, 51, 59, 62	3.3.10.5	2		8
	3.3.10.7	Cdr's COA Development Briefing	2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 44, 46, 47, 48, 51, 59, 62	3.3.10.6	1		1
	3.3.10.8	Brief Cdr on refined COAs	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44 ,46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.3.10.7	1		1
3.4	COA Analysis, Comparison & Selection						
3.4.1	Prepare for COA Analysis						
	3.4.1.1	Review Cdr's Guidance & evaluative criteria	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	1.5.1.3	0.2		5
	3.4.1.2	Finalize Specifics for each evaluative criteria	6, 10, 18, 31	3.4.1.1	0.3		5
	3.4.1.3	Determine Events to analyze	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 31	3.4.1.2	0.4		5

	3.4.1.4	Prepare products	6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,31, 32, 33, 34, 39, 44, 51, 59, 62	3.4.1.3	0.5		10
3.4.2	Conduct and Record Analysis						
	3.4.2.1	Convene the JPG	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 58, 59, 59, 62	3.4.1.4	0		
	3.4.2.2	Review COA	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	3.4.2.1	0.2		
	3.4.2.3	Analyze events Action-reaction-counteraction	"	3.4.2.2	2.5		
	3.4.2.4	Refine COA as required	"	3.4.2.3	0.5		
	3.4.2.5	Record Synchronization results	"	3.4.2.4	1		
	3.4.2.6	Record Assessment of each evaluative criteria	"	3.4.2.5	1		
3.4.3	Compare Analysis findings						
	3.4.3.1	Build a comparison matrix	"	3.4.2.6	0.5		
	3.4.3.2	Assess findings	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	3.4.3.1	0.5		
	3.4.3.3	Prepare Recommends and COA select briefing	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	3.4.3.2	0.5		
3.4.4	Conduct COA Selection Briefing						
	3.4.4.1	Brief Cdr on assessment and recommendation	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.4.3.3	0.6		1
	3.4.4.2	Refine COA based on decision and guidance	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	1.6.1.4	0.4		8
	3.4.4.3	Post briefing and associated Plan Products	10, 18, 62	3.4.4.2	0.2		10
	3.4.4.4	Develop Warning Order input for OPS	10, 9, 11, 12, 13, 14, 15, 18, 31, 44, 59, 62	3.4.4.2	0.8		8
3.5 Wargame the Selected COA							
	3.5.1.1	Prepare for wargame	6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 31, 32, 33, 34, 39, 44, 51, 59, 62	1.6.1.4, 3.4.4.4	0.5	24	10
	3.5.1.2	Conduct Wargame	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.5.1.1	2.5		8
	3.5.1.3	Refine COA	"	5.3.1.6	0.2		8
	3.5.1.4	Refine ISR	"	3.5.1.3	0.2		8
	3.5.1.5	Refine Node-Action options	"	3.5.1.4	0.2		8
	3.5.1.6	Refine Support Actions	"	3.5.1.5	0.2		8
	3.5.1.7	Refine C2	"	3.5.1.6	0.2		8
	3.5.1.8	Refine Protection Concepts of Operations	"	3.5.1.7	0.2		8
	3.5.1.9	Finalize Synchronization Matrix	"	3.5.1.8	1		8
	3.5.1.10	Brief Cdr on Wargame Results	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62	3.5.1.9	0.5		1
3.6 Build ETO							
	3.6.1.1	Review Commander's and COA Results	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	1.6.1.5	0.5		8
	3.6.1.2	Obtain Deployment Information	7, 9, 10, 11, 12, 13, 14, 18, 32, 33	3.6.1.1	0.2		8
	3.6.1.3	Assess Deployment Information	7, 9, 10, 11, 12, 13, 14, 18, 32, 33	6.1.1.7	0.3		8

3.6.1.4	Obtain Logistics Information	29, 30, 31, 32, 34	3.6.1.1, 3.2.13.2	0.2		8
3.6.1.5	Obtain Transportation Information	30, 31, 33	3.6.1.1	0.2		8
3.2.1.6	Assess Transportation Information	30, 31, 33	6.3.1.8	0.3		8
3.6.1.7	Obtain ISR Plan	39, 41, 42	3.6.1.1, 3.7.1.7	0.2		8
3.6.1.8	Assemble and Build ETO Section and Annexes	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	3.6.1.3, 3.6.1.4, 3.6.1.6, 3.6.1.7	1		8
3.6.1.9	Cross-Check all Products	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	3.6.1.8	0.8		8
3.6.1.10	Review and Forward	6	3.6.1.9	1		1
3.6.1.11	Review and Approve	2, 3	3.6.1.10	0.5		1
3.6.1.12	Review and Approve	1	3.6.1.11	0.5		1
3.6.1.13	Pass ETO to OPS	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 28, 31, 32, 33, 34, 38, 39, 43, 44, 46, 47, 48, 51, 59, 62	3.6.1.12	0.8		5
3.6.1.14	Publish ETO	10, 18, 62	3.6.1.13	0.2		5
3.7 Collection Mgt Board Preparations						
3.7.1.1	Review Commander's Guidance	37, 38, 39, 58, 59, 37, 42, 51	1.6.1.5	0.2		5
3.7.1.2	Review MOE	"	3.7.1.1, 2.4.1.5, 2.4.3.3, 2.4.5.5, 2.4.6.3	0.4		5
3.7.1.3	Evaluate Observability of MOE Indicators	"	3.7.1.2	0.4		5
3.7.1.4	Define Collection Requirements	39, 41, 42	3.7.1.3	0.4		5
3.7.1.5	Assign Collection Responsibilities	39, 41, 42	3.7.1.4	0.3		5
3.7.1.6	Assign Reporting Responsibility	37, 38	3.7.1.5	0.3		5
3.7.1.7	Publish Collection Plan	39	3.7.1.6	0.2		5
CIE						
4.1 Install CIE Tools						
4.1.1.1	Dummy	48, 61	1.3.1.1			
4.2 Develop/Establish CIE						
4.2.1.1	Develop Baseline Structure	36, 48, 60, 61, 62, 65	4.1.1.1			
4.2.1.2	Collaboration Requests	"	4.2.1.1			
4.2.1.3	Establish Working Groups	"	4.2.1.2			
4.2.1.4	Establish Reachback	"	4.2.1.3			
4.2.1.5	Establish MOAs	"	4.2.1.4			
4.2.1.6	Establish Info Sharing Rules	"	4.2.1.5			
4.3 Test CIE Toolkit						
4.3.1.1	ID Gaps & Friction Points	36, 48, 60, 61, 62, 65	4.2.1.6			
4.3.1.2	Establish parallel paths/workarounds	"	4.3.1.1			
4.3.1.3	Develop Operational CIE Structure	"	4.3.1.2			
Training/Exercises						
5.1 Initial ONA Training for All Personnel						
5.1.1.1	Develop ONA Training Plan	Done pre-event				

5.1.1.2	Conduct ONA Training for RCC Personnel	Done pre-event				
5.1.1.3	Conduct ONA Training for New Personnel	50, 60, 61, 62, 63, 64, 65	1.3.1.1			
5.1.1.4	Conduct ONA Training for Collab Personnel	"	1.4.2.4			
5.1.1.5	Conduct Cross-Discipline & Proficy Training	"	1.5.1.3			
5.2 CIE Training for All Personnel						
5.2.1.1	Develop CIE Training Plan	Done pre-event				
5.2.1.2	Conduct CIE Training	48, 61, 62, 65	4.2.1.6			
5.2.1.3	Assess Changes/Workaround Effects	"	4.3.1.3			
5.2.1.4	Train Final CIE Configuration	"	5.2.1.3			
5.3 Develop and Conduct Wargame/Exercise						
5.3.1.1	Review Anticipated Actions	6, 7, 8, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 37, 40, 41, 42, 43, 44, 45, 46, 47, 48, 58	3.5.1.2			
5.3.1.2	Develop Wargame/Exercise	6, 7, 19, 20, 22, 24, 26, 29, 37, 40, 43, 46, 47, 48, 58	5.3.1.1			
5.3.1.3	Conduct Wargame	6, 7, 8, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 37, 40, 41, 42, 43, 44, 45, 46, 47, 48, 58	5.3.1.2			
5.3.1.4	Analyze Wargame Results	6, 7, 19, 20, 22, 24, 26, 29, 37, 40, 43, 46, 47, 48, 58	5.3.1.3			
5.3.1.5	Develop Wargame Report	6, 7, 19, 29, 37, 58	5.3.1.4			
5.3.1.6	Report Wargame Results	6, 7, 19, 29, 37, 58	5.3.1.5			
Deployment/Logistics/Transportation Plan						
6.1 Deployment Planning		**RCC Function**				
6.1.1.1	Develop Component Personnel Requirements	7	3.6.1.2			10
6.1.1.2	Develop Augmentation Requirements	7	6.1.1.1			10
6.1.1.3	Develop Force Mobility Plan	7	6.1.1.2			10
6.1.1.4	Determine CRCs and IDSs	7	6.1.1.3			10
6.1.1.5	Develop Movement Requirements	7	6.1.1.4			10
6.1.1.6	Mobilization Feasibility Analysis	7	6.1.1.5			10
6.1.1.7	Determine Lift Requirements	7	6.1.1.6			10
6.2 Develop Logistics Plan		**RCC Function**				
6.2.1.1	Develop Logistics Options	31	3.2.13.1	0		10
6.2.1.2	Determine APODs & SPODs	31	6.2.1.1	0		10
6.2.1.3	Determine Host Nation Support	31	6.2.1.2	0		10
6.2.1.4	Develop Logistics Annex	31	6.2.1.3	0		10
6.2.1.5	Produce TPFDD	31	6.2.1.4	0		10
6.2.1.6	Logistics Feasibility Analysis	31	6.2.1.5	0		10
6.2.1.7	Populate CIE Logistics CROP	31	6.2.1.6	7		10
6.3 Develop Transportation Plan		**RCC Function**				
6.3.1.1	ID Own Transportation Sources	30	3.6.1.5	0		10
6.3.1.2	ID Coalition Transportation Sources	30	6.3.1.1	0		10
6.3.1.3	Develop Transportation Options	30	6.3.1.2	0		10

6.3.1.4	Analyze Transportation System Capabilities	30	6.3.1.3	0		10
6.3.1.5	ID Potential Operational Impacts	30	6.3.1.4	0		10
6.3.1.6	System Vulnerabilities	30	6.3.1.5	0		10
6.3.1.7	Transportation Feasibility Analysis	30	6.3.1.6	0		10
6.3.1.8	Prepare Transportation Report	30	6.3.1.7	7		10
Additional External Guidance						
7.1 ROE Modifications						
7.1.1.1	Assess Roe Modification Implications	8, 15	3.2.17.1	2		10
7.1.1.2	Modify ROE	8, 15	7.1.1.1	2		10
7.2 Draft Info Ops and Deception Guidance						
7.2.1.1	Develop Info Ops Plan	43, 44, 45, 46, 47, 48	3.2.18.1	2		10
7.2.1.2	Develop Deception Plan	"	7.2.1.1	2		10
7.2.1.3	Transmit Plans	"	7.2.1.2	0		10

Scheduled Meetings		**Attendance**	**Duration**	**Start**
8.1 Non-Work Periods				
8.1.1.1	Breakfast	All	1.0	0730
8.1.1.2	Lunch	All	0.75	1230
8.1.1.3	Dinner and PT	All	1.0	1730
8.1.1.4	Overnight	All	10	2000
8.2 Operations Tour				
8.2.1.1	Morning Operations Turnover	6, 58, 19, 20, 22, 24, 26, 28, 29, 30, 41, 43	1.0	0700
8.2.1.2	Evening Operations Turnover	6, 58, 19, 20, 22, 24, 26, 28, 29, 30, 41, 43	1.0	1900
8.3 Commander's Meetings				
8.3.1.1	Commander's Morning Update	1, 2, 3, 4, 6, 35, 60, 19, 29, 8, 15, 58, 20, 22, 24, 26, 28, 30, 41, 43	1.0	0830
8.3.1.2	Higher Headquarters' Meeting	1, 2, 3, 4, 6, 35, 60, 19, 29, 8, 15, 58	0.5	1200
8.4 Group, Team, and Cell Meetings				
8.4.1.1	Joint Coordination Board Meeting	1, 2, 3, 4, 6, 35, 60, 19, 29, 8, 15, 58, 20, 22, 24, 26, 28, 30, 41, 43, 58	1.0	1630
8.4.1.2	IS Team Daily Briefing	35, 36, 37, 39, 43, 44, 45, 46, 47, 48	0.25	0805
8.4.1.3	KM Team Daily Briefing	60, 61, 62, 63, 64, 65	0.25	0805
8.4.1.4	Plans Team Daily Briefing	15, 16, 17, 38, 39, 44, 51, 53, 54, 55, 56, 57, 58, 59	0.25	0805
8.4.1.5	Logistics Plans Team Daily Briefing	29, 30, 31, 32, 33	0.25	0805
8.4.1.6	Morning Effects Assessment Cell Meeting	51, 58, 59, 12, 15, 16	1.0	1600
8.4.1.7	Afternoon Effects Assessment Cell Meeting	51, 58, 59, 12, 15, 16	1.0	1330

Appendix 2. PROCESS ARCHITECTURE MAPS

The following pages contain maps of four levels of SJFHQ processes and sub-processes, including arrows indicating the information flow between them. The six basic processes are shown on the first map in the headers to the columns. Sub-processes are shown in boxes in all maps. Arrows show information flow directions. Information content is not shown.

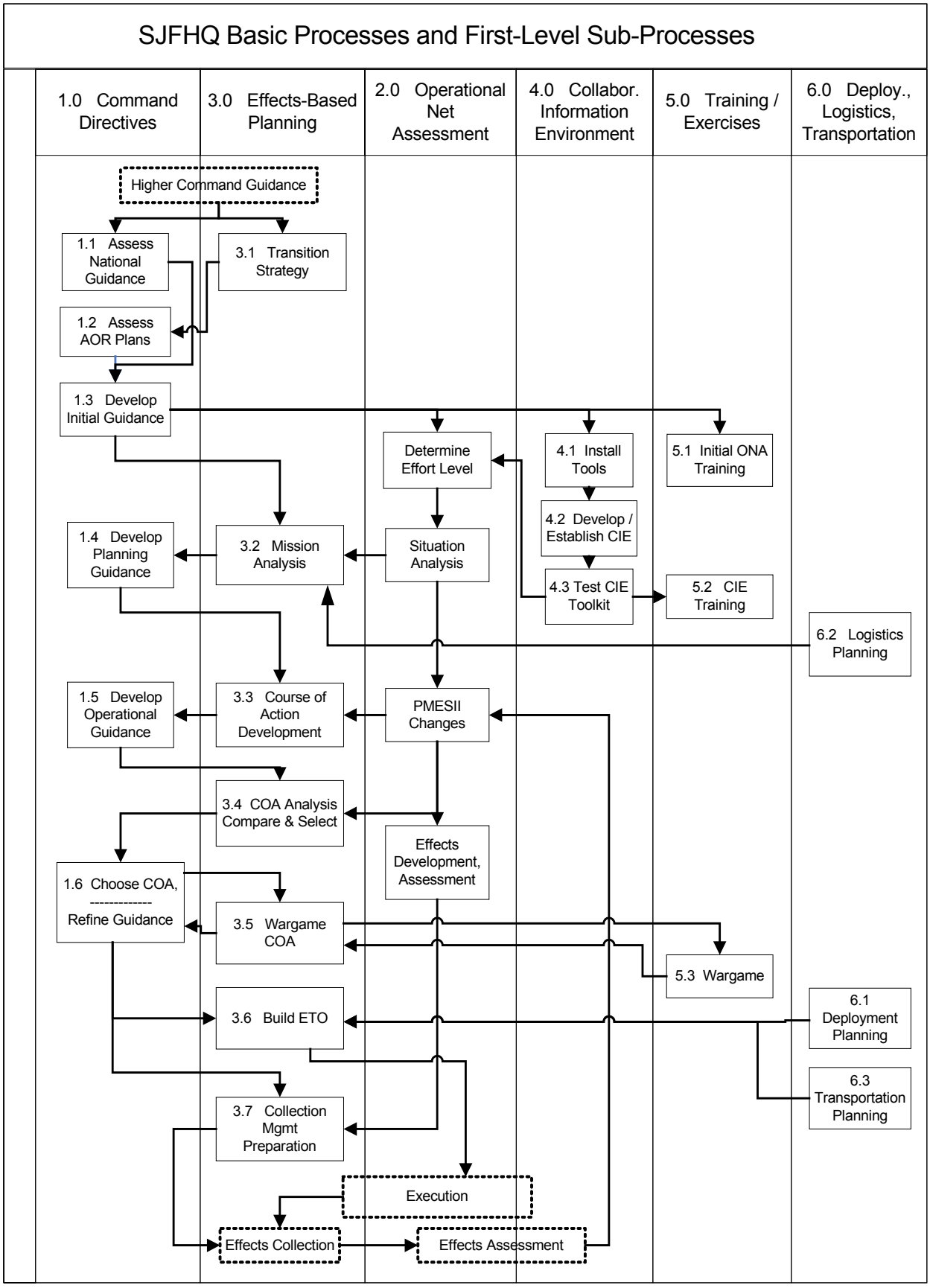
A numbering scheme is used to show the relationship between processes and their contained sub-processes:

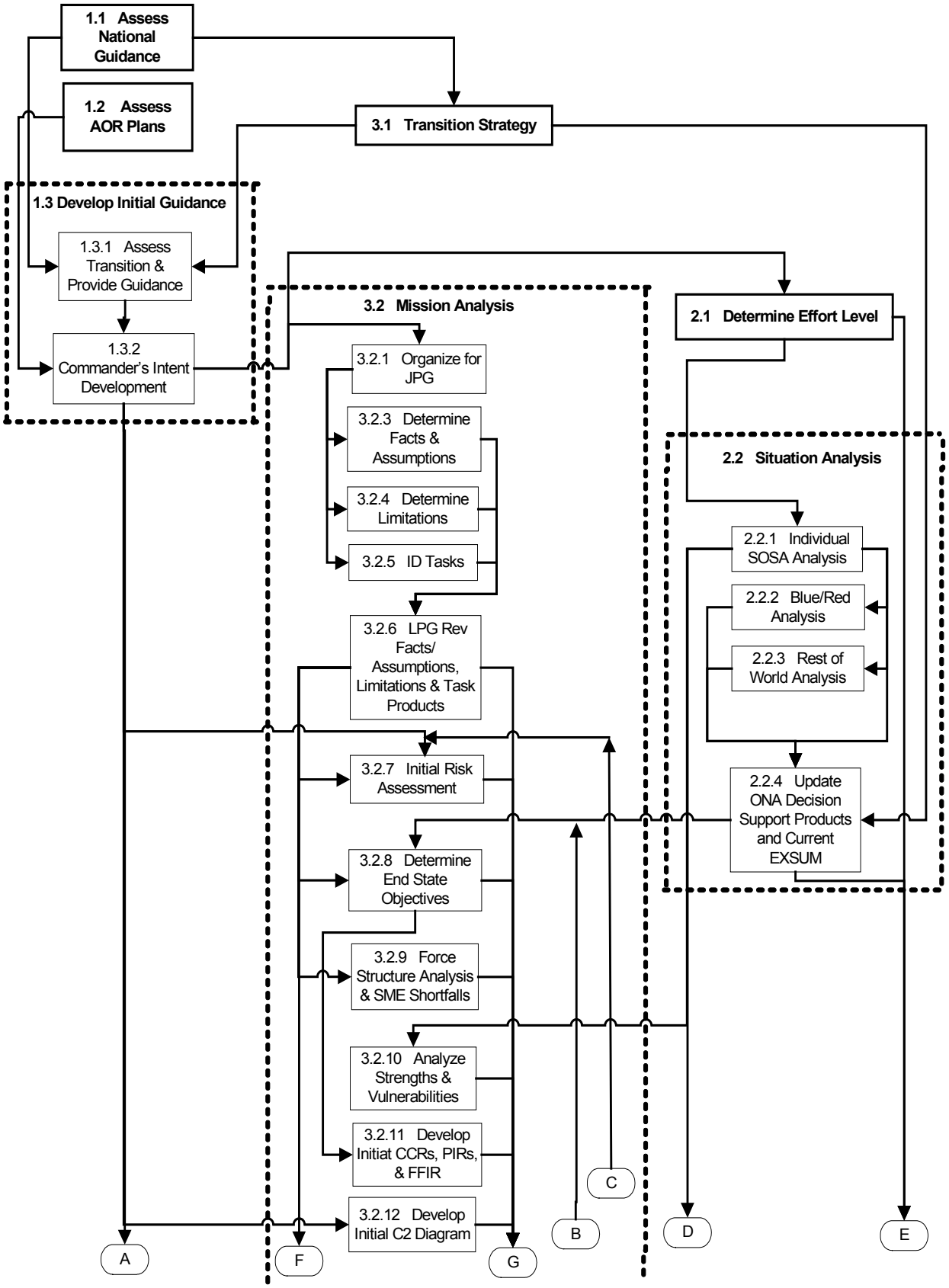
N.0	Basic process
N.m	First-level sub-process
N.m.m	Second-level sub-process
N.m.m.m	Third-level sub-process (task level)

N and m represent the appropriate numbers.

Tasks that produce information are on the third sub-process level. It is only at this level that information is produced/consumed and the information links (arrows) show actual information transfer. Higher-level connections are not task specific, rather show only interrelationships at that level.

The number of sub-processes is large enough that only the first map can be contained on one page. The other two maps have been segmented into three and five pages respectively. Connections between the sub-processes that cross pages are shown using lettered, oval connections.


SJFHQ Basic Processes and First-Level Sub-Processes
1.0 Command Directives
3.0 Effects-Based Planning
2.0 Operational Net Assessment
4.0 Collabor. Information Environment
5.0 Training / Exercises
6.0 Deploy., Logistics, Transportation
Higher Command Guidance
1.1 Assess National Guidance
3.1 Transition Strategy
1.2 Assess AOR Plans
1.3 Develop Initial Guidance
Determine Effort Level
4.1 Install Tools
5.1 Initial ONA Training
4.2 Develop / Establish CIE
1.4 Develop Planning Guidance
3.2 Mission Analysis
Situation Analysis
4.3 Test CIE Toolkit
5.2 CIE Training
6.2 Logistics Planning
1.5 Develop Operational Guidance
3.3 Course of Action Development
PMESII Changes
3.4 COA Analysis Compare & Select
Effects Development, Assessment
1.6 Choose COA, ---------- Refine Guidance
3.5 Wargame COA
5.3 Wargame
3.6 Build ETO
6.1 Deployment Planning
6.3 Transportation Planning
3.7 Collection Mgmt Preparation
Execution
Effects Collection
Effects Assessment


1.1 Assess National Guidance
1.2 Assess AOR Plans
3.1 Transition Strategy
1.3 Develop Initial Guidance
1.3.1 Assess Transition & Provide Guidance
1.3.2 Commander's Intent Development
3.2 Mission Analysis
2.1 Determine Effort Level
3.2.1 Organize for JPG
3.2.3 Determine Facts & Assumptions
3.2.4 Determine Limitations
3.2.5 ID Tasks
3.2.6 LPG Rev Facts/ Assumptions, Limitations & Task Products
2.2 Situation Analysis
2.2.1 Individual SOSA Analysis
2.2.2 Blue/Red Analysis
2.2.3 Rest of World Analysis
2.2.4 Update ONA Decision Support Products and Current EXSUM
3.2.7 Initial Risk Assessment
3.2.8 Determine End State Objectives
3.2.9 Force Structure Analysis & SME Shortfalls
3.2.10 Analyze Strengths & Vulnerabilities
3.2.11 Develop Initiat CCRs, PIRs, & FFIR
3.2.12 Develop Initial C2 Diagram
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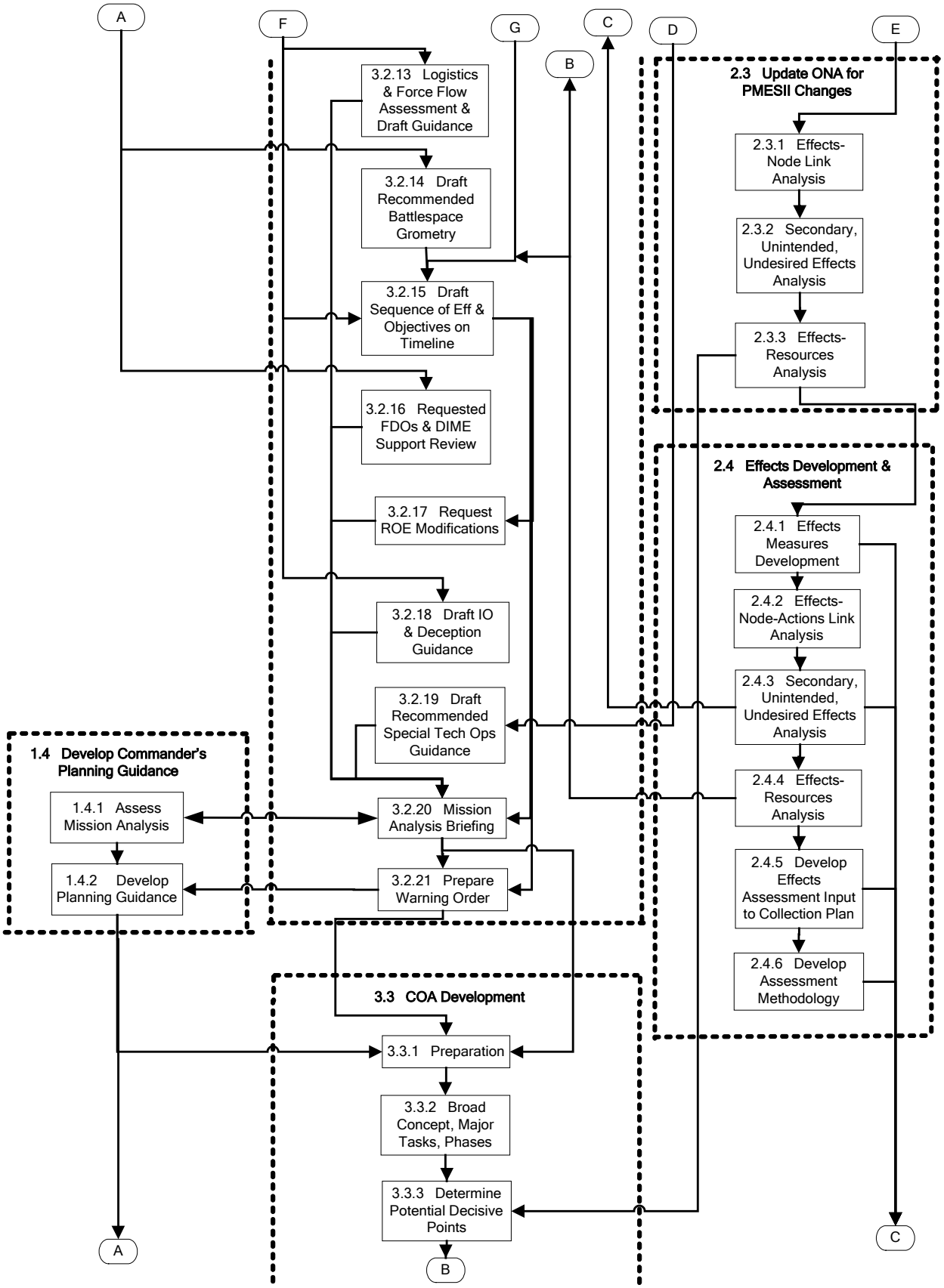
A
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B
3.2.13 Logistics & Force Flow Assessment & Draft Guidance
3.2.14 Draft Recommended Battlespace Grometry
3.2.15 Draft Sequence of Eff & Objectives on Timeline
3.2.16 Requested FDOs & DIME Support Review
3.2.17 Request ROE Modifications
3.2.18 Draft IO & Deception Guidance
3.2.19 Draft Recommended Special Tech Ops Guidance
3.2.20 Mission Analysis Briefing
3.2.21 Prepare Warning Order
2.3 Update ONA for PMESII Changes
2.3.1 Effects-Node Link Analysis
2.3.2 Secondary, Unintended, Undesired Effects Analysis
2.3.3 Effects-Resources Analysis
2.4 Effects Development & Assessment
2.4.1 Effects Measures Development
2.4.2 Effects-Node-Actions Link Analysis
2.4.3 Secondary, Unintended, Undesired Effects Analysis
2.4.4 Effects-Resources Analysis
2.4.5 Develop Effects Assessment Input to Collection Plan
2.4.6 Develop Assessment Methodology
1.4 Develop Commander's Planning Guidance
1.4.1 Assess Mission Analysis
1.4.2 Develop Planning Guidance
3.3 COA Development
3.3.1 Preparation
3.3.2 Broad Concept, Major Tasks, Phases
3.3.3 Determine Potential Decisive Points
A
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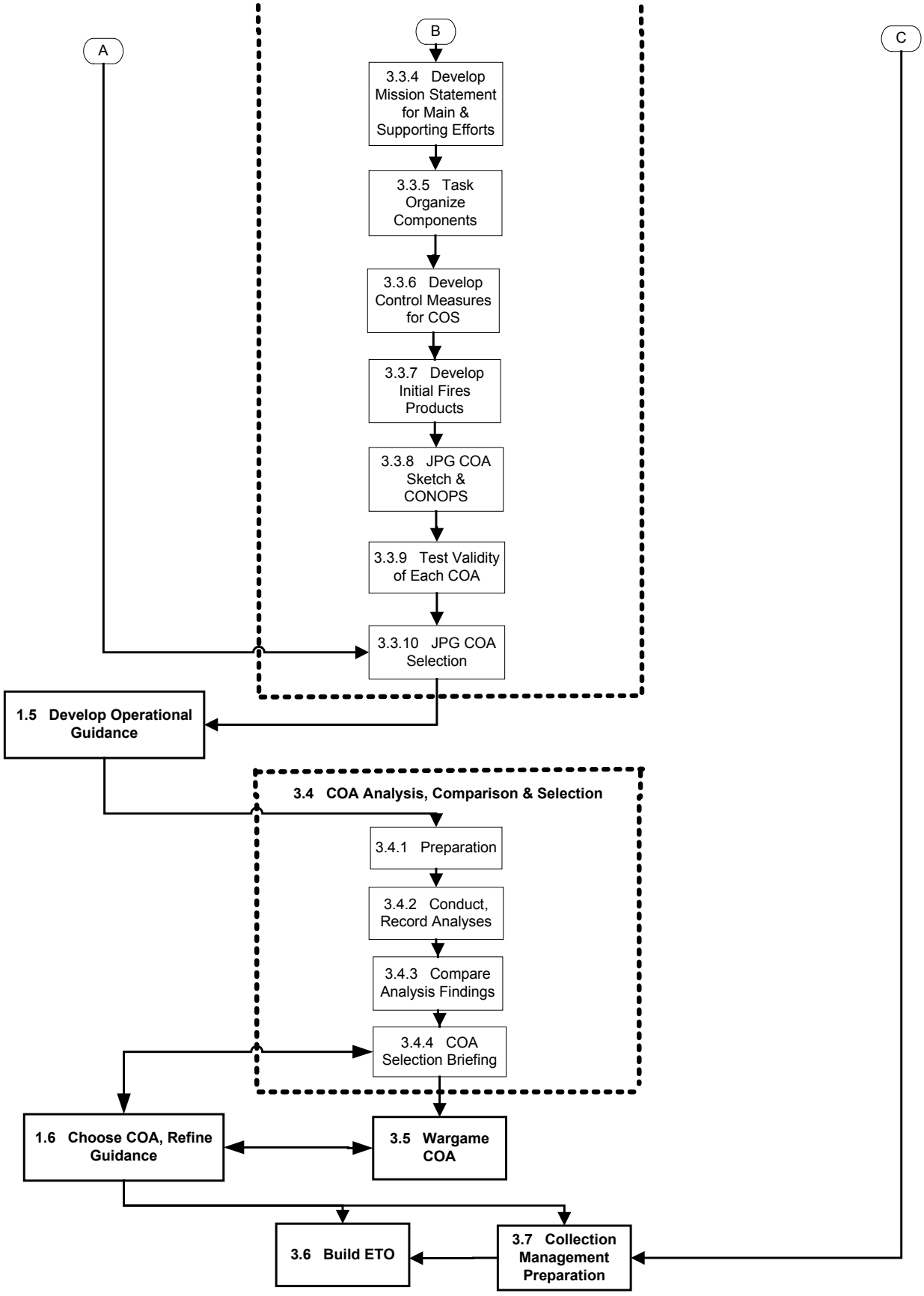
A
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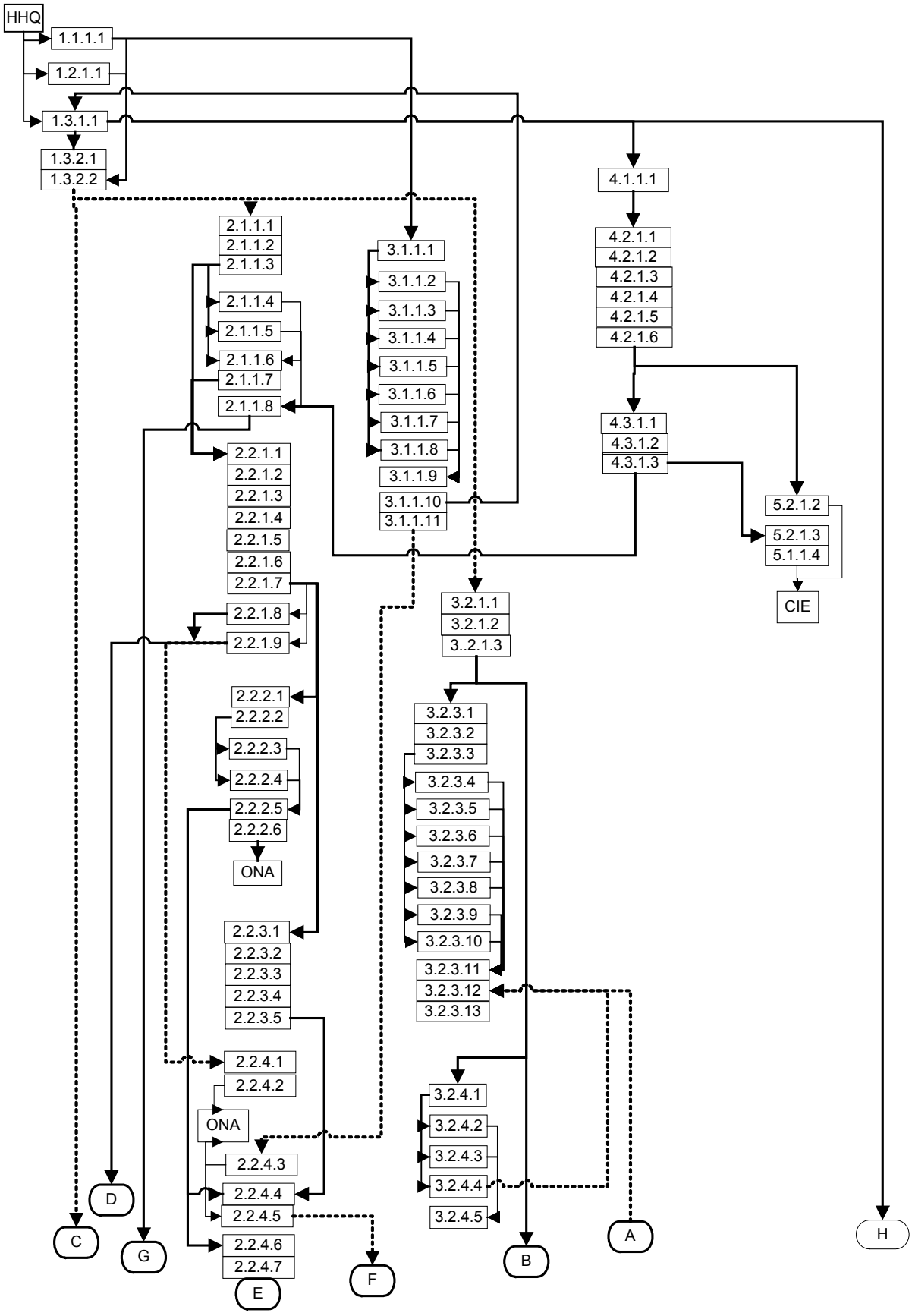
3.3.4 Develop Mission Statement for Main & Supporting Efforts
3.3.5 Task Organize Components
3.3.6 Develop Control Measures for COS
3.3.7 Develop Initial Fires Products
3.3.8 JPG COA Sketch & CONOPS
3.3.9 Test Validity of Each COA
3.3.10 JPG COA Selection
1.5 Develop Operational Guidance
3.4 COA Analysis, Comparison & Selection
3.4.1 Preparation
3.4.2 Conduct, Record Analyses
3.4.3 Compare Analysis Findings
3.4.4 COA Selection Briefing
1.6 Choose COA, Refine Guidance
3.5 Wargame COA
3.6 Build ETO
3.7 Collection Management Preparation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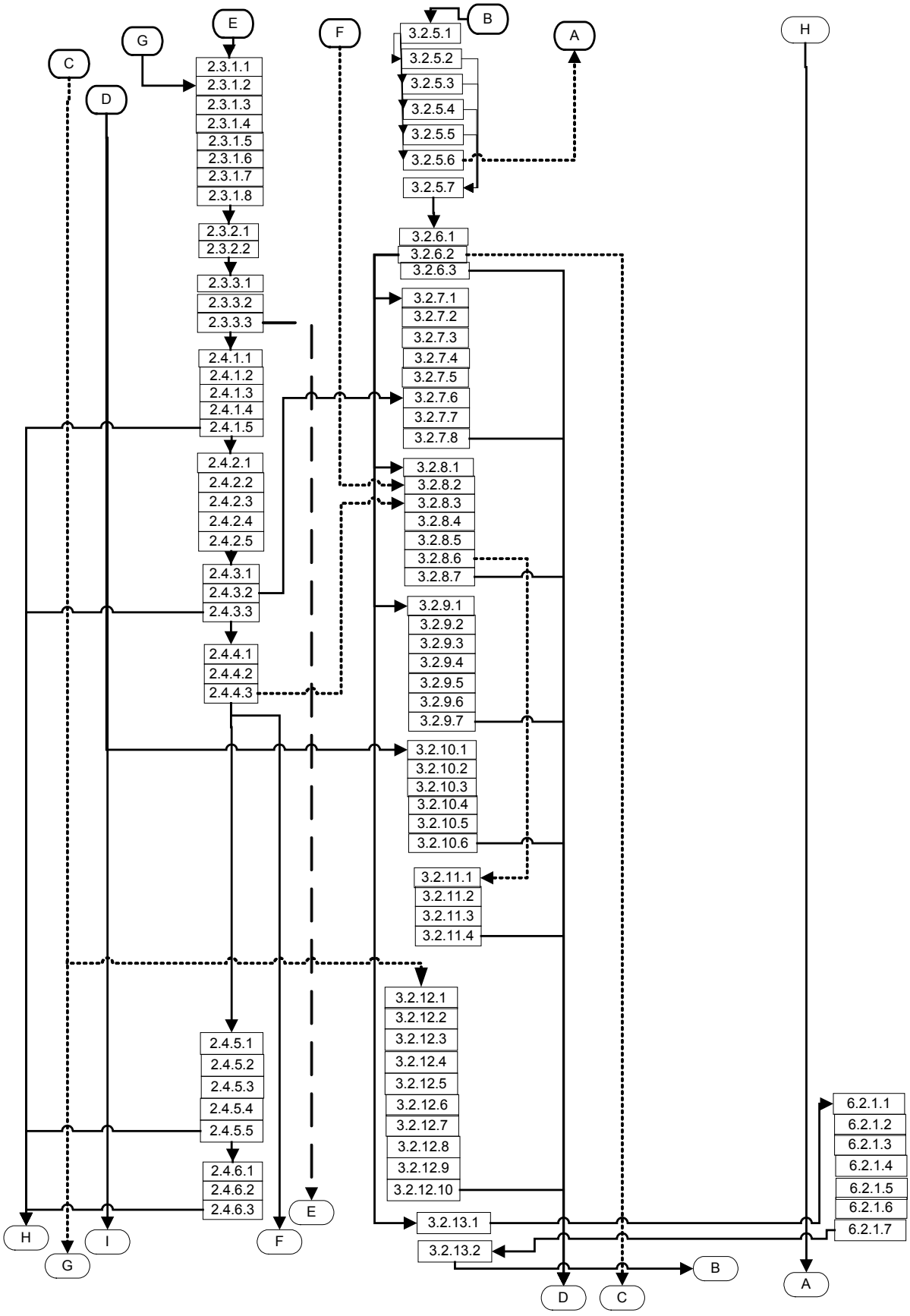
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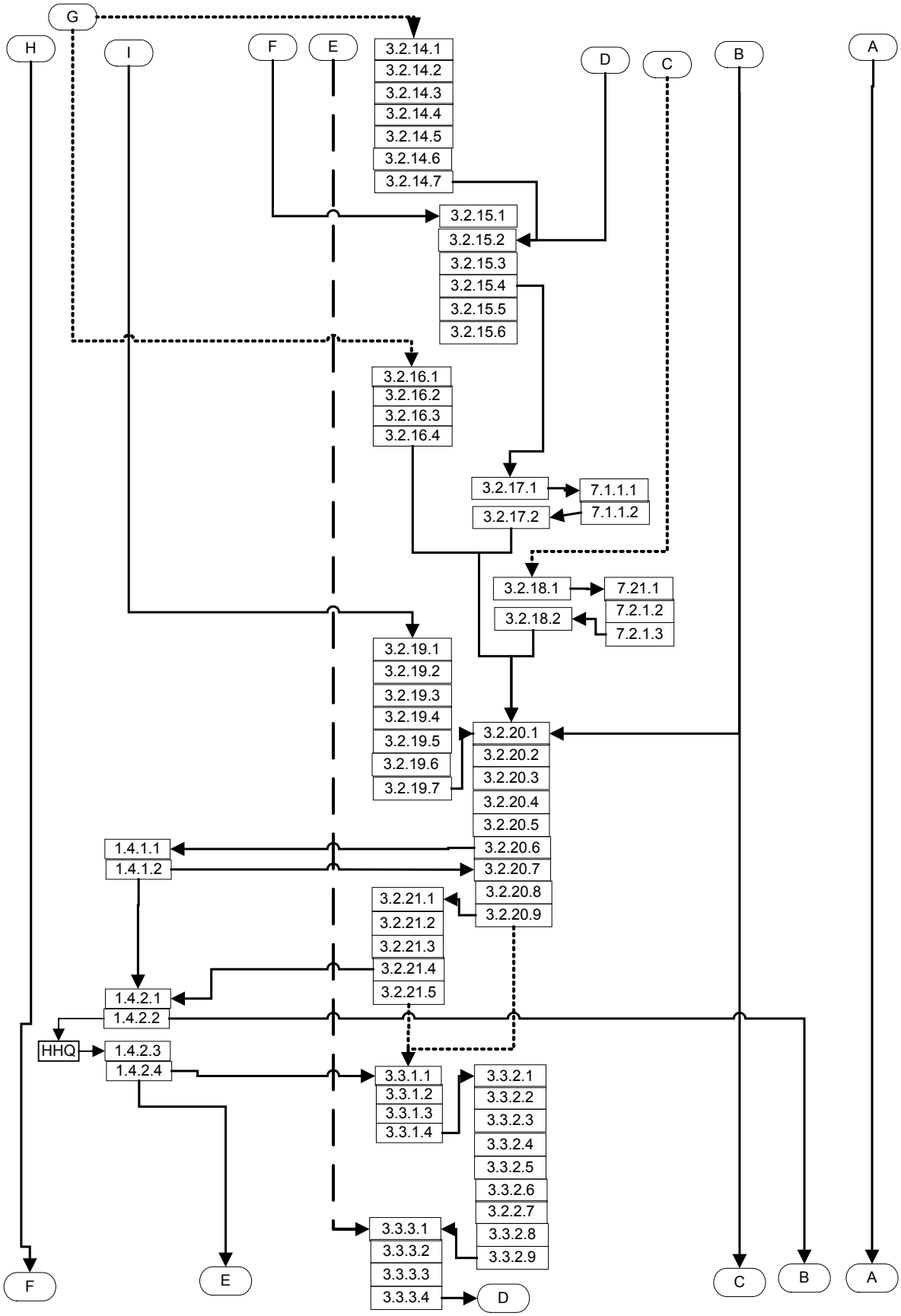
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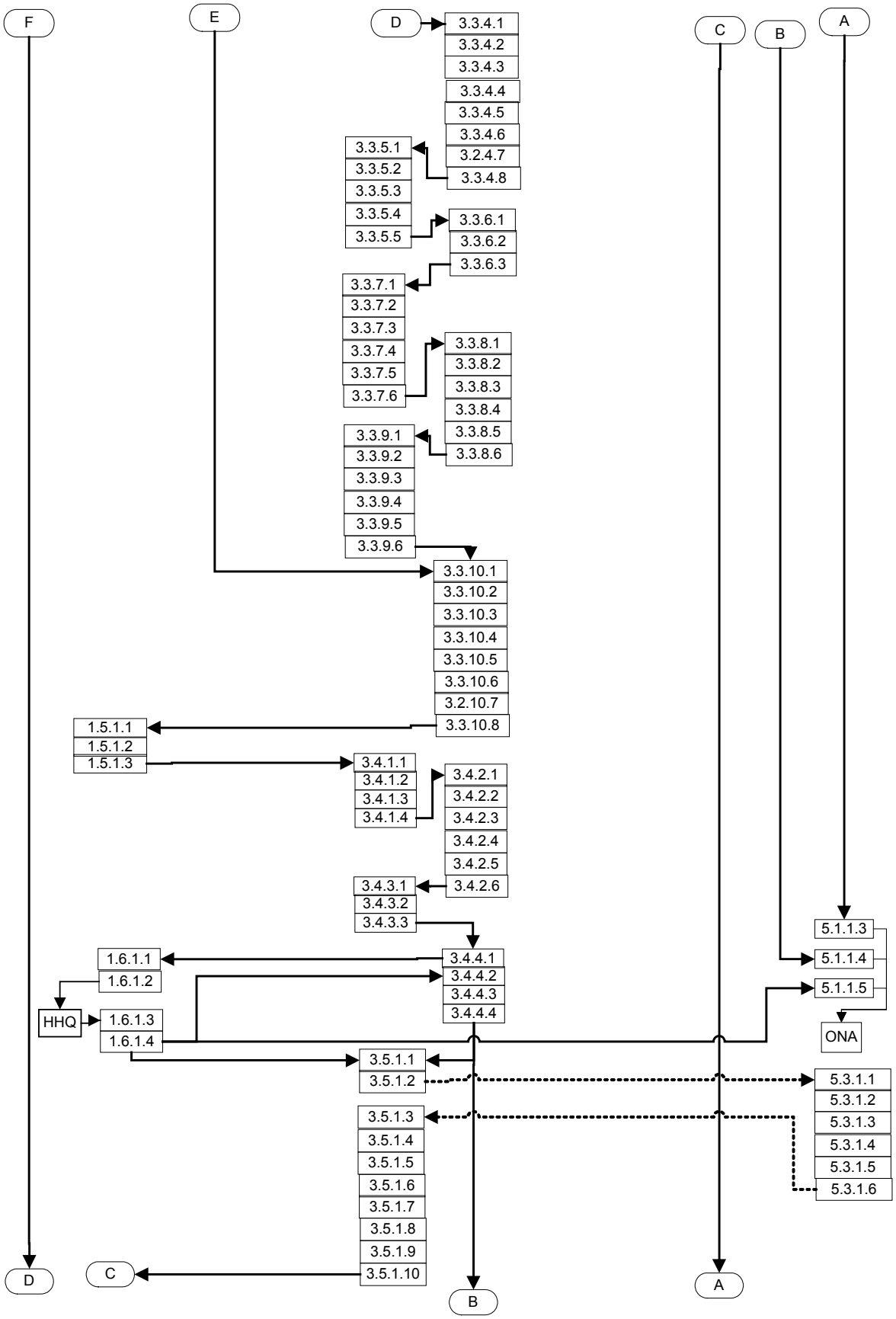
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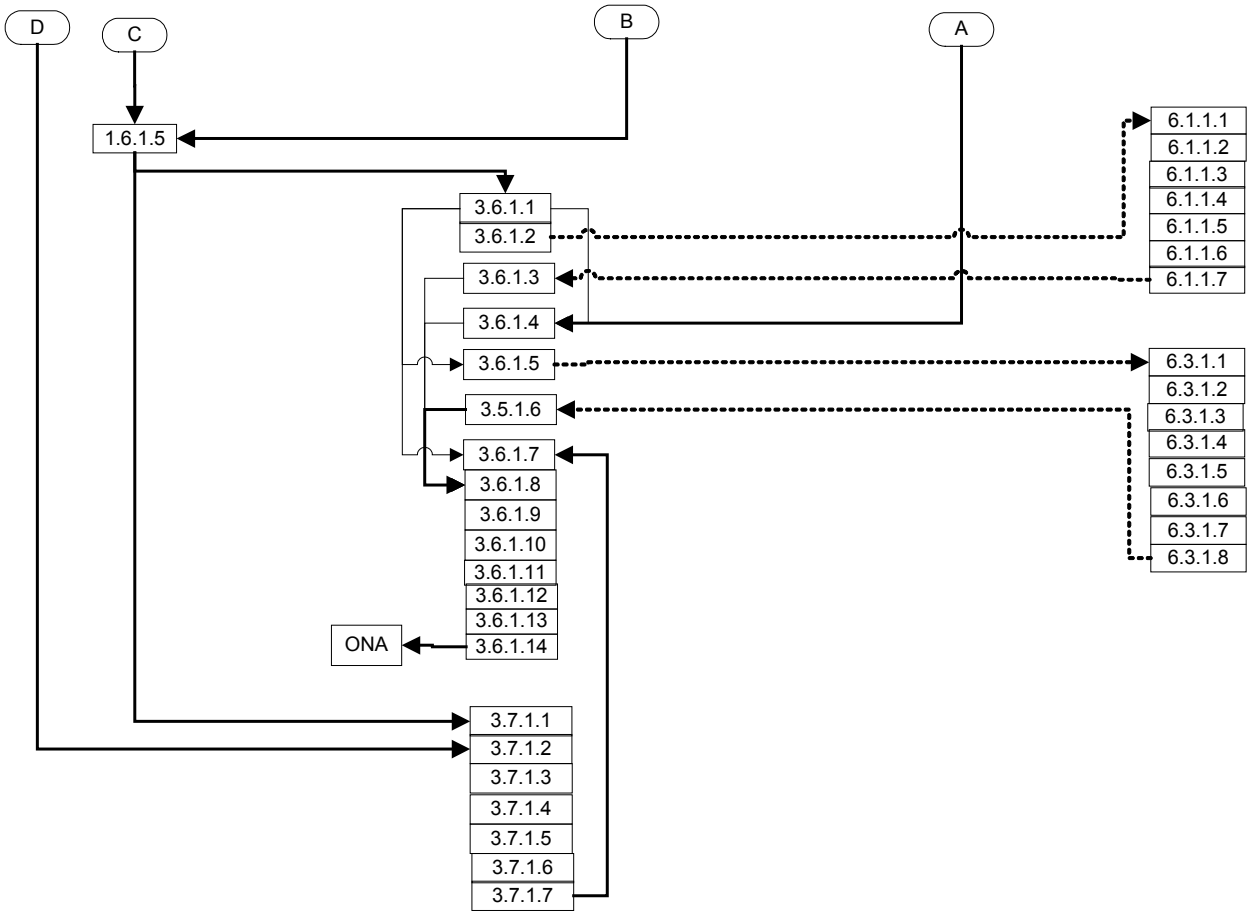
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Appendix 3. **Simulation Run Details**

1.0 Model

1.1 One Focus item is generated each day for each record in the Focus database table

1.1.1 All parents/children are spawned the first day.

1.1.2 Parents and children are only spawned on subsequent days if they contain Sub-Processes that are "cycled"

1.1.2.1 Focus, Process and Sub Process items do not spawn children until On Initiate precedence is fulfilled

1.1.3 A log record for each Focus item is created in the Focus Log table

1.1.4 A batch id is generated that associates Focus record/item with day produced

1.1.2.1 This batch ID is utilized throughout the model to keep spawned children linked to the correct sequence of parents

1.1.5 Each Focus item spawns child items for each related record in the Process table

1.1.3.1 A log record for each Process item is created in the Process Log table

1.1.3.2 The Process item is passed along to the Process h-block in zero-time

1.1.6 Each Process item spawns child items for each related record in Sub-Process table

1.1.4.1 Log record for each Sub-Process item created in Sub-Process Log table

1.1.4.2 Sub Process item is passed along to the Sub Process h-block in zero-time

1.1.7 Each Sub-Process item spawns child items for each related record in Tasks table

1.1.7.1 A log record for each Task item is created in the Tasks Log table

1.1.7.2 Task item is passed (thrown) to the assigned person h-block in zero-time

1.1.7.2.1 Catch block numbers for each of the person h-blocks are listed in the Team Members table

1.1.7.2.2 Tasks do not begin processing until On Initiate precedence fulfilled

1.2 Once children spawned, Focus, Process, Sub Process wait until all children completed

1.2.1 The number of children spawned for a parent is recorded in the parent log record

1.2.2 Number of children completed for a parent is tracked in the parent log record and compared to number spawned to determine if all children have be completed

1.3 Tasks processed in the assigned Person h-block according to priority and delay times

1.3.1 Although designed for additional future flexibility, a priority convention has been developed for this model iteration.

1.3.1.1 A "cusp" of 7 has been established to split normal from priority tasks

1.3.1.2 A priority of 10 is considered a normal task

1.3.1.3 A priority of 8 is considered a standard (off site) meeting

1.3.1.4 Priority of 3 is considered a priority task, is typically an all-hands meeting

1.3.1.5 A priority of 1 is considered an urgent task and pre-empts all other tasks

1.3.2 Task are routed by priority levels

1.3.2.1 Tasks < 7 are routed to the priority processing area

1.3.2.2 Tasks set to a priority of 8 are routed to the standard meeting area

1.3.2.3 Tasks set to priority 10 considered normal task, routed to multitasking area

1.3.3 Tasks are processed by priority

1.3.3.1 Tasks in multitasking processed using provided math in Activity, Multiple block

1.3.3.2 Standard meeting tasks processed as standard delays, allow multitasking continue

1.3.3.3 Tasks in the priority area are processed one at a time and all other meeting/multitasking activity is halted.

1.3.4 Shift start time and duration assigned to each person also control task processing

1.3.5 Task delay times are pulled from Task definition tables and then are adjusted by the skill level factor in the team members record

1.4 When all children for a Focus, Process and Sub Process record are completed, the parent item checks/waits for On Complete precedence (if any) to be fulfilled.

1.4.1 Task items also held (not completed) until their On Complete precedence fulfilled

1.4.1.1 On Complete precedence is being utilized to make sure all collaborative Tasks are completed before a follow-on precedence is triggered

1.5 All item layers can be subject to external approval (involvement) with a delay and the possibility of rework.

1.5.1 Parameters are set in definition tables

1.5.1.1 Parameters set to zero to model no external delay or probability of rework

1.5.2 If rework occurs, all child items are re-spawned through lower layers

1.5.3 Delay times for rework Tasks are a factor of the definition delay time.

2.0 Database

2.1 The models process layering is captured with a parent to child relationships

2.1.1 The top layer is called "Focus"

2.1.2 The second layer is called "Process

2.1.2.1 All Process are children of a single Focus parent

2.1.3 The third layer is called "Sub-Process"

2.1.3.1 All Sub-Processes are children of a single Process

2.1.4 The fourth layer is called "Tasks"

2.1.4.1 All Tasks are children of a single Sub-Process

2.1.5 All Tasks are assigned to a single individual of the 65 SJFHQ team

2.1.5.1 If a task is done collaboratively, individual tasks (records) are decomposed in the model database for each team member involved

2.1.5.1 Separate parameters are assigned to each team members task to represent contribution and approval/rework outcomes

2.1.5.2 Parameters are task delay times, approval delay times, probability of rework, factor of time delay to complete rework

2.1.6 Controlling precedence of work flow is done by implementing "Initiate On" and "Complete On" in Precedence tables

2.1.6.1 Each process layer has their own precedence table

2.1.6.2 Precedence table records must be synchronous (the same list, same order) as the parent layer table.

2.1.6.3 Precedence is only between equal layers, i.e., Tasks can only have other Tasks as Initiate On or Complete On precedence

2.1.6.4 If an On Initiate precedence is selected, this same-batch ID log record must be completed before this record starts

2.1.6.4.1 Log record is created but item is not released

2.1.6.5 If an On Complete precedence is selected, this same-batch ID log record must be completed before this record completes

2.1.6.5.1 Item begins processing but is not completed

2.2 Shift start times and durations are assigned to each team member

2.3 Skill levels are assigned to each team member

2.3.1 Skill levels are rated as high, normal, or low

2.3.2 A factor is set against these three categories to adjust the delay time

2.3.2.1 The factor for the normal skill level is 1

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